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US ARMY CORPS
OF ENGINEERS
New England District

Contract No. DACW33-03-D-0004

Delivery Order No. 22

June 2008

Final

2007 Environmental Monitoring, Sampling, and Analysis Reports

New Bedford Harbor Superfund Site



New Bedford, Massachusetts

- I. Sediment Monitoring Summary Report**
- II. Water Quality Monitoring Summary Report**
- III. North of Wood Street Monitoring
Summary Report**
- IV. Sawyer Street Semi-annual Groundwater
Monitoring Technical Memorandum**



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FINAL
**Sediment Monitoring
Summary Report
2007 Remedial Dredging**



**Environmental Monitoring, Sampling, and
Analysis**

**New Bedford Harbor Superfund Site
New Bedford Harbor, MA**

FINAL REPORT

**Sediment Monitoring Summary Report
2007 Remedial Dredging**

**Environmental Monitoring, Sampling, and Analysis
New Bedford Harbor Superfund Site
New Bedford Harbor, MA**

Submitted to:

**Department of the Army
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Prepared by:

**Battelle
397 Washington Street
Duxbury, MA 02332
(781) 934-0571**

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EXECUTIVE SUMMARY

Sediment sampling was performed at New Bedford Harbor from June to November 2007 in support of remedial dredging activities. In 2007, dredge activities occurred primarily in two areas, including 'Area G' which encompasses southern sections of DMU-1 and DMU-102 and 'Area H' which encompasses sections of DMU-9 and DMU-10, and DMU-11. Dredging activities targeted removal of sediments to the approximate depth of the target dredge elevation (where polychlorinated biphenyl (PCB) concentrations are predicted, based on modeling, to be less than the 10 mg/kg remediation criteria). Sediment cores were collected before, during, and after dredging to evaluate the target dredge elevation estimates through visual characterization and observation of the elevation of sediment-type transitions. Sediment monitoring was also performed in 2007 at the OU3 Pilot Cap and proposed Boat House areas to characterize PCBs in sediment.

Site-wide geostatistical modeling based on historical PCB data has been used to develop an estimation of the vertical elevation of PCB contamination in the sediments (target dredge elevation). The dredge plan for each year is based on the target dredge elevations and contours within the planned footprint of dredging. However, changes in sediment condition over time or uncertainties in the model can result in a discrepancy between the target dredge elevation estimates and the existing features at the site. Elevation data based on the visual characterization of cores collected prior to dredging at Areas G and H in June 2007 were used to refine the dredge plan in terms of target dredge depths and sediment thickness. As a result target dredge depths were reduced, thereby reducing dredging and disposal efforts.

The collection of post-dredge cores revealed that the depth of the sediment surface and the overall thickness of OL (organic silt, organic clay according to the Unified Soil Classification System) layers were reduced across all dredged areas. However, the post-dredge cores collected within the same dredge areas (but generally at different locations) generally had less distinct visual transitions compared to the pre-dredge cores. The transitions generally occurred over a relatively broad band (>0.5-ft) of mixed sediment and in many cases, the elevation of the post-dredge visual transition also occurred at a deeper elevation than observed during the pre-dredge coring investigation.

Total PCB concentrations in post-dredge surface sediment sampled at Area G ranged from 74 mg/kg to 660 mg/kg, with no clear distribution trend except that total PCB concentrations appeared to be lower in surface sediment sampled along the eastern boundary of the dredge area. Post-dredge total PCB concentrations ranged from 5.4 mg/kg to 1,400 mg/kg at Area H. The highest PCB concentrations were measured in the fined-grained, organic-rich sediments sampled along the western boundary. Lower PCB concentrations were measured in sandy, low TOC sediments sampled near the eastern boundary.

There were no substantive changes in total PCB concentrations since 2005 in surficial sediments sampled at the OU3 Pilot Cap site, suggesting that the cap placement is still effective in this area.

Total PCB concentrations in sediment sampled at the proposed Boat House area were highest at the surface and generally decreased with depth. Most of the sediments sampled 2-ft below the surface had total PCB concentrations well below 1 mg/kg.



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1.0 INTRODUCTION

1.1 Site Description

The New Bedford Harbor Superfund Site (Site), located in Bristol County, Massachusetts (MA), extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into 17,000 adjacent acres of Buzzards Bay (Figure 1). Industrial and urban development surrounding the harbor has resulted in sediments becoming contaminated with high concentrations of many pollutants, notably polychlorinated biphenyls (PCBs) and heavy metals. Two manufacturers in the area used PCBs while producing electronic devices from the 1940s to the late 1970s, when the use of PCBs was banned by the U.S. Environmental Protection Agency (USEPA). Based on human health concerns and ecological risk assessments, USEPA added New Bedford Harbor to the National Priorities List in 1983 as a designated Superfund Site. Through an Interagency Agreement between the USEPA and the U.S. Army Corps of Engineers, New England District (USACE NAE), the USACE is responsible for carrying out the design and implementation of the remedial measures at the Site. The Site has been divided into three areas – the upper, lower and outer harbors – consistent with geographical features of the area and gradients of contamination (Figure 2).



Figure 1. Location of the Site in Southeastern, MA.

Aerovox Inc. located in New Bedford, MA used PCBs in the manufacture of electrical capacitors from approximately 1940 to 1977. This facility is located in the upper harbor and is considered one of the major sources of historic PCB contamination to New Bedford Harbor. The highest concentrations of PCBs were found in sediments in a 5-acre area in the northern portion of the Acushnet River Estuary adjacent to the Aerovox facility. These ‘hot spot’ sediments, which contained PCBs upwards of 100,000 milligrams per kilogram (mg/kg), were removed between 1994 and 1995 as part of USEPA’s 1990 “Hot Spot” Record of Decision (ROD). Full scale remediation dredging per the 1998 Upper and Lower Harbor ROD was initiated in 2004 and continued in 2005, 2006, and 2007. Another known source of PCB contamination in New Bedford Harbor is related to activities at the Cornell-Dubilier mill on the western shore of the outer harbor. In 2005, a 15 acre underwater cap pilot project was implemented near Cornell-Dubilier to cap PCB-contaminated sediments (Figure 2).



Figure 2. Location of the 2007 Dredge Activity Area within New Bedford Harbor



The Site is divided into a series of Dredge Management Units (DMU) based on contamination levels, contamination sources, topography, and other factors. In 2007, dredge activities were conducted at two areas: ‘Area G’ encompassing sections of DMU-1 and DMU-102 and ‘Area H’ encompassing sections of DMU-9 and DMU-10, and DMU-11 (Figure 3).

The remediation of the Site involves the excavation and dredging of approximately 880,000 cubic yards of PCB contaminated sediment. The majority of contaminated material is being removed utilizing a hydraulic dredge that pumps dredge slurry to the project’s Sawyer Street facility where it is mechanically processed to remove all sand, gravel, and debris material. The silt and clay size materials are then pumped to the Area D Dewatering Facility located on Herman Melville Boulevard where it is mechanically dewatered and transported off-site for disposal.

1.2 Project Objectives

The primary objectives of the 2007 sediment monitoring program were to 1) conduct pre-dredge coring to determine the elevation of the visual transition and sediment thickness of the OL layer (‘OL’ in the Unified Soil Classification System (USCS), defined as organic silt or organic clay) to assist dredge planning, 2) conduct progress-dredge coring to provide field reconnaissance information during the dredge season to maximize overall dredging productivity, and 3) conduct post-dredge coring to assess the overall performance of the dredging operation and support future needs. Additional objectives included conduct of harbor-wide monitoring at locations determined by the USEPA and USACE NAE. This included sediment monitoring at the OU3 Pilot Cap site near the Cornell-Dubilier Mill and the proposed Boat House area.

1.2.1 Pre-dredge Sediment Sampling

The entire upper harbor, including the planned 2007 dredge areas depicted in Figure 3, have been parceled into discrete 25-foot by 25-foot ‘z-blocks’. During remedial design, a geostatistical model was used to predict a target elevation for dredging each z-block. This target dredge elevation, as shown in Figures 4 (Area G) and 5 (Area H), represents the elevation where PCB concentrations are predicted to be less than the 10 mg/kg remediation criteria. Using target dredge elevations in combination with bathymetric data, a preliminary dredge plan was developed which estimated the required depth of dredging and the thickness of the overlying sediment to be removed. The pre-dredge sediment sampling plan was designed to confirm these estimates or adjust elevations as needed. Coring locations were placed onto the z-block map to achieve sufficient spatial coverage for making an evaluation of the target dredge elevations. In areas where the target dredge elevations changed substantially within adjacent z-blocks the concentration of sampling locations was increased. Visual characterization data from the pre-dredge cores was used by NAE and Jacobs Engineering Group (Jacobs) to prepare the final 2007 dredge plan.



Figure 3. 2007 Dredge Areas.

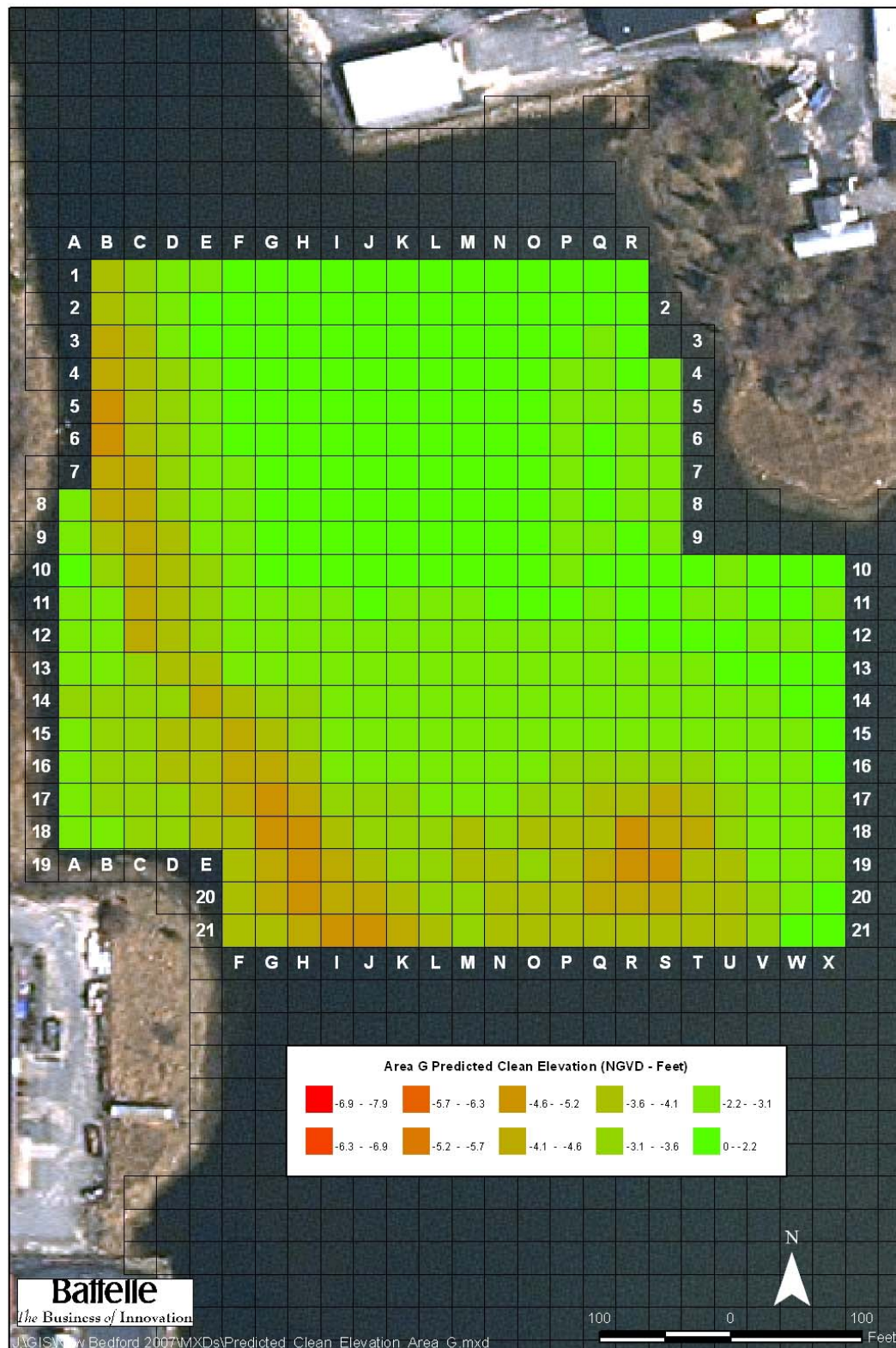


Figure 4. 2007 Planned Dredge Area G with Z-blocks and Target Dredge Elevations.

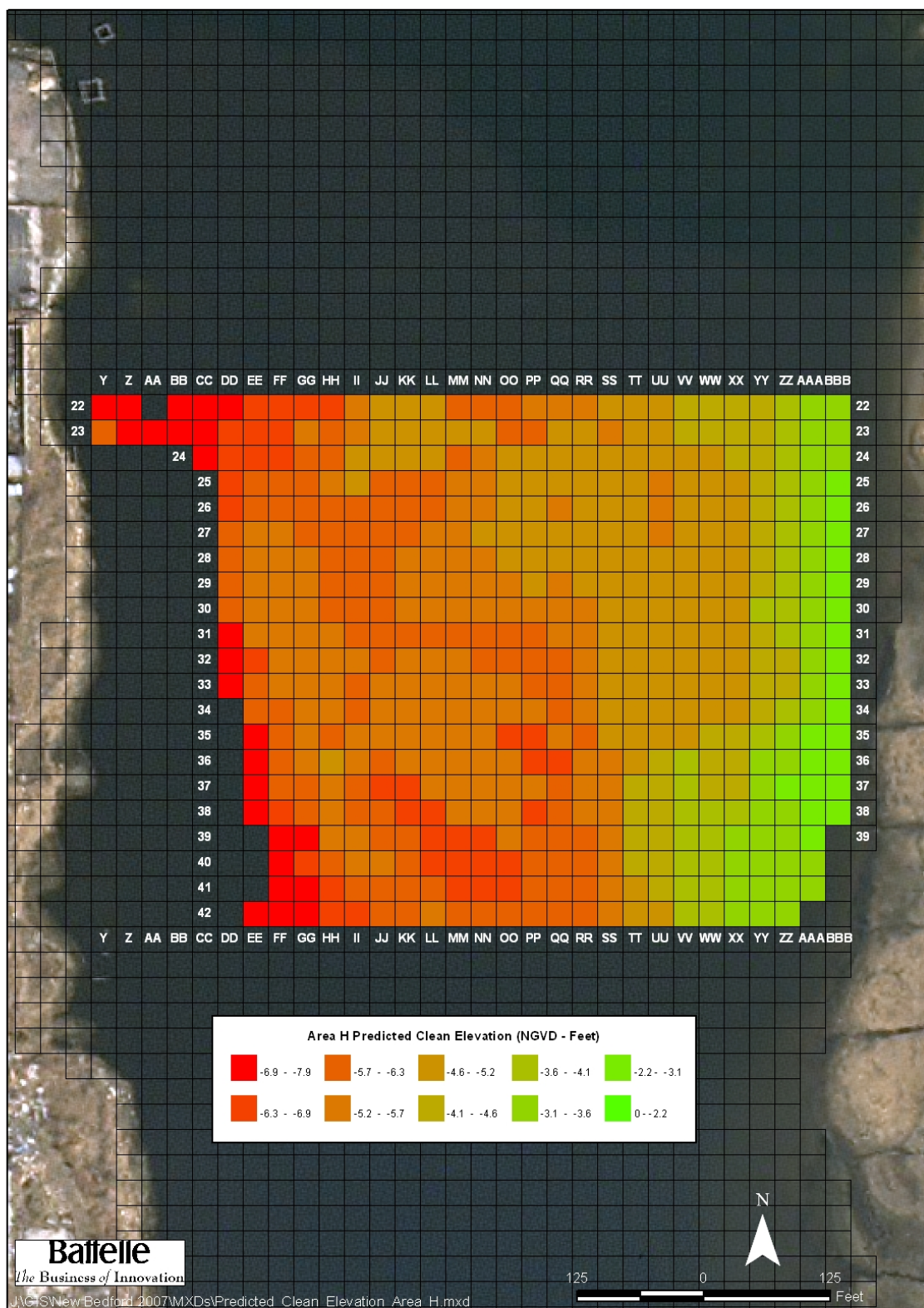


Figure 5. 2007 Planned Dredge Area H with Z-blocks and Target Dredge Elevations.



1.2.2 Progress-dredge Sediment Sampling

Push cores were collected during dredge activities to evaluate the progress of dredging operations and dredge effectiveness. Dredging operations were conducted based on opportunity (tides, weather, equipment, etc) and sample locations were determined through weekly discussions between NAE, Battelle, and Jacobs, based on the dredge operations. Samples collected during this activity received visual characterization only (Section 2.2).

1.2.3 Post-dredge Sediment Sampling

Post-dredge sediment sampling was conducted to assess the sediment condition relative to the target dredge elevation for the entire 2007 dredging event and to assist with future site needs. Visual characterization of these samples was used to determine the elevation and thickness of overlying material remaining after the completion of dredging. Chemical analysis was also performed to assess PCB concentrations remaining in the sediments in these areas. Supplemental analyses, including grain size composition, total organic carbon (TOC), and volatile organic compound (VOC), were performed on selected samples at the direction of USACE NAE.

1.2.4 Harbor-wide Sampling

Additional harbor-wide monitoring was conducted at the direction of USEPA and USACE NAE. In 2007, sediment monitoring was performed to characterize PCBs in sediments at the OU3 Pilot Cap and the proposed Boat House areas.

The OU3 Pilot Cap site is a localized area of elevated PCB concentrations located outside the hurricane barrier in New Bedford, MA (Figure 2). In 2005 the OU3 Pilot Cap site was capped with parent material dredged during the construction of a navigational dredged material Confined Aquatic Disposal (CAD) cell in New Bedford Harbor. Annual monitoring has been conducted since 2005 to assess temporal trends in PCBs in surficial sediments and the effectiveness of the cap.

Sampling was conducted in the area of the proposed Boat House location, located in the upper Harbor, and was completed during post-dredge activities. Sediment cores were collected at 10 locations to characterize PCBs in sediment at three depth intervals: 0-1 ft, 1-2 ft, and 2-3 ft.

1.3 Report Organization

This report describes the activities conducted in 2007 during sampling in New Bedford Harbor in support of dredging operations as part of the remediation of the Site. A description of the Site and project objectives is presented in Section 1. A description of the 2007 sampling and analysis methods is provided in Section 2. Results of the 2007 sediment monitoring, including sediment characteristics and chemistry, are provided in Section 3.0. A discussion of the sediment results is provided in Section 4.0. References are provided in Section 5.0.



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2.0 METHODS

Environmental sampling and analysis methods utilized for the 2007 sediment monitoring program are summarized below and described in detail in the project work plans (Battelle, 2006a, b; Battelle, 2007).

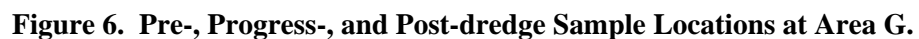
2.1 Sediment Collections

2.1.1 Pre-, Progress-, and Post-dredging Sampling

Pre-, progress-, and post-dredge core samples were collected in 2007 at Areas G (Figure 6) and H (Figure 7). Sampling of sediments was conducted with a push-core sampling device utilizing 3-inch diameter Lexan™ core barrels. The sampling device was designed to securely hold one end of a pre-cut length of core barrel. Core lengths were targeted so that penetration exceeded the expected depth of the target dredge elevation by at least one foot. A piston assembly inside the core barrel was used to create suction during retrieval of the sample to prevent sediment loss from the bottom of the barrel.

Once the individual components of the push core sampler were assembled, sample collection was achieved as follows. The core assembly was measured from the bottom of the core to the top of the assembly. The piston assembly was positioned just inside the leading end of the core liner and the piston line was held loosely on deck. The device was lowered into the water until the leading end of the core bore barrel contacted the sediment surface. The piston attachment line was then tied off securely on the deck of the survey vessel, thus fixing the elevation of piston assembly. In driving the push-core into the sediment, the piston created a syringe effect as the core liner was driven past the fixed elevation of the piston. The core liner was then driven to the maximum depth of either refusal or the limiting depth allowed by the length of the piston attachment line. When retrieving the core assembly (with sample) tension was held on the piston line so that the piston and sample were not pulled back down the core liner by suction from the sediments. The sampler was recovered onto the deck of the survey vessel. The bottom end of the core barrel was fitted with a plastic cap, after which the sediment on the external body of the sampler was rinsed off. After thoroughly cleaning the sampling device the core liner was removed from the socket assembly, the piston assembly was then removed, and the top of the core liner was fitted with a plastic end cap.

Upon recovery, the core was examined for acceptability. The goal of the dredge area sampling was to identify visual transitions. If it did not appear that a clear transition layer was captured, the field team used professional judgment to determine the cause. Possible causes included; 1) the core was not long/deep enough to capture transition layers, 2) smearing of overlying sediments obscured the transition, and 3) the entire core was composed of the characteristic native material. In the first two cases the collection of a second core (longer for case 1) at the same location was conducted. In the third case the field team repositioned slightly and collected a second core. Other factors which were considered in determining acceptability included: 1) too much water at the top of the core, 2) signs of significant compaction at the top of the core, and 3) signs of loss of sediment from the bottom of the core. Because of the wide range of possible scenarios, overall core acceptability was based on the experience and judgment of the Chief Scientist and the field team. All decision making was documented on the Sediment Sampling Log sheets (Appendix A).



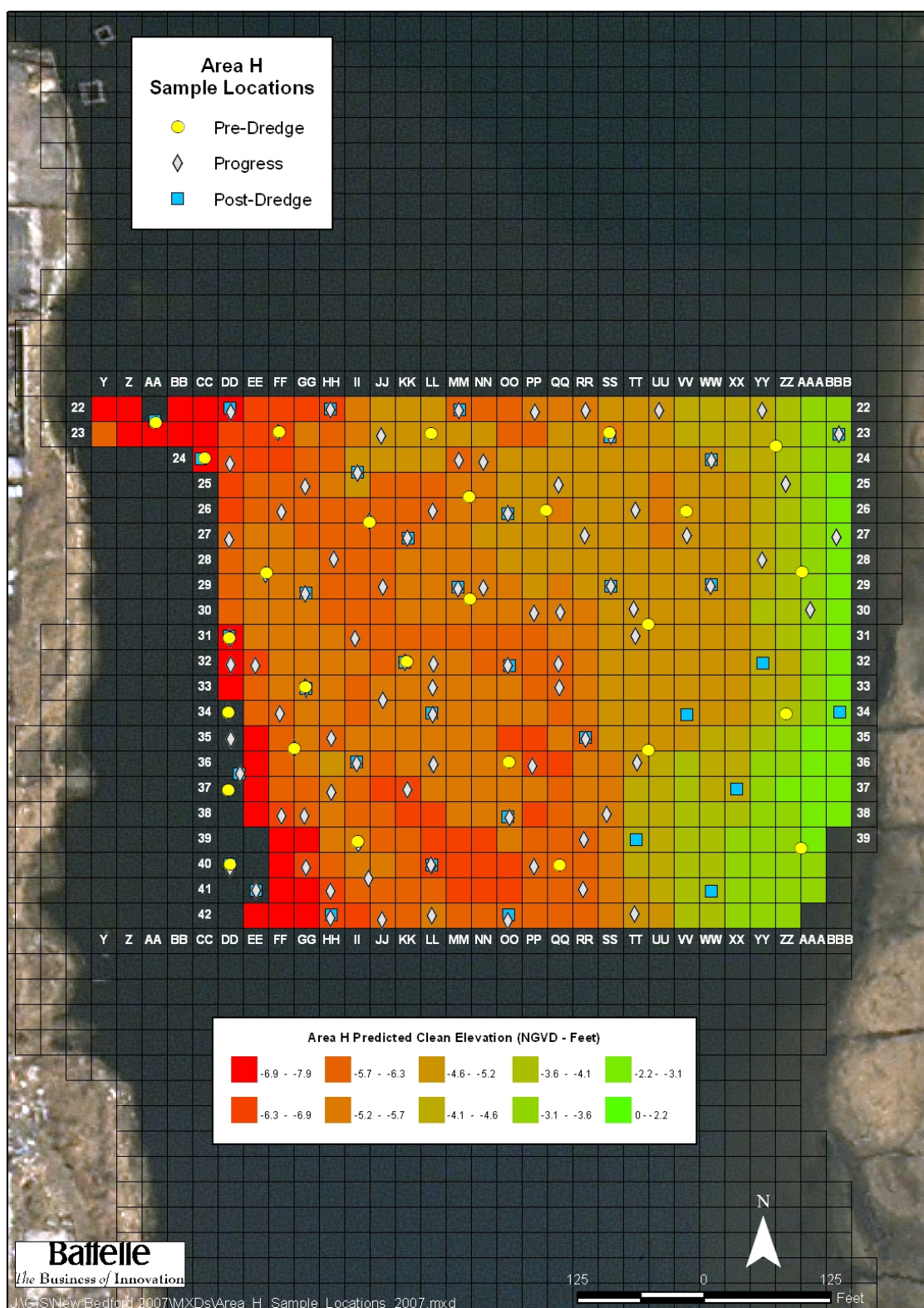


Figure 7. Pre-, Progress-, and Post-dredge Sample Locations at Area H.



Determination of the accurate vertical elevation of the samples was critical in achieving the objectives of the project. Elevation of the water levels, sediment-water interface, apparent target dredge elevation, and other sediment transition zones were all critical measurements for this project (see Section 3 and Appendix A). The project elevation datum is MLW NGVD-29. A series of measurements were conducted for each sample to correct elevations for tidal fluctuations. All measurements were recorded as ± 0.1 feet. The required measurements and techniques are listed below. See Figure 8 for graphical depiction of the measurements.

A = Water depth. The water depth was recorded using either a lead line or a measuring pole.

B = Length of push core assembly. Prior to deployment, the full length of the push core assembly from the top of the handle to the bottom edge of the core liner was recorded.

C = Water surface to top of core assembly handle. Once the core assembly was fully inserted (refusal or full core penetration), the length of the assembly remaining above the water surface was recorded.

D = Core Length. The core length, from bottom to top, was measured and recorded.

E = Surveyed elevation. Prior to operations the dredge contractor installed a fixed sheet pile with markings indicating a survey elevation (NGVD 29). This elevation was recorded and served as the reference point for all elevation calculations.

F = Water surface from surveyed elevation. After sample collection, the survey vessel navigated to the fixed sheet pile with surveyed elevations (position to be determined) and the distance from the water surface to the surveyed elevation was recorded.

From these measurements a number of calculations were made to determine true elevations:

$E - F = \text{Elevation of water surface (G)}.$

$G - (B - C) = \text{Elevation of bottom of core (H)}.$

The *H* elevation (bottom of core) was used to determine the elevation of all visual transitions, including apparent target dredge elevation. i.e.:

$H + (\text{distance to visual transition}) = \text{Elevation of visual transition (target dredge elevation)}$

$H + D = \text{Elevation of sediment water interface (I)}.$

The elevation of the sediment water interface was also calculated from:

$G - A = \text{Elevation of sediment water interface (I}_2\text{)}.$

I and *I*₂ were compared at each station. In soft sediments the sediment water interface may have been difficult to discern from soundings (i.e. it is difficult to feel). Additionally, the sediment water interface within a core was subject to compaction during collection, settling after recovery, and other factors which may have impacted the accuracy of elevation measurements. If *I* and *I*₂ varied by more than 1.0 foot, the core was discarded and a new sample collected.

Once the core was deemed acceptable, a Sediment Sampling Log sheet was completed. Sample collection data, including collection date and time, station coordinates, and sample ID, were documented on Sediment Sampling Log forms. The field measurements required for determining vertical elevation of the sediment-water interface and each transitional layer was also included on the Sediment Sampling Log sheet. The core barrel was labeled with a sample ID, date, and the orientation for the top of the core. Chain of Custody for each core section was initiated in the field.



Core samples were capped tightly, stored on ice in the field, and transferred to the Sawyer Street facility for processing (Section 2.2).

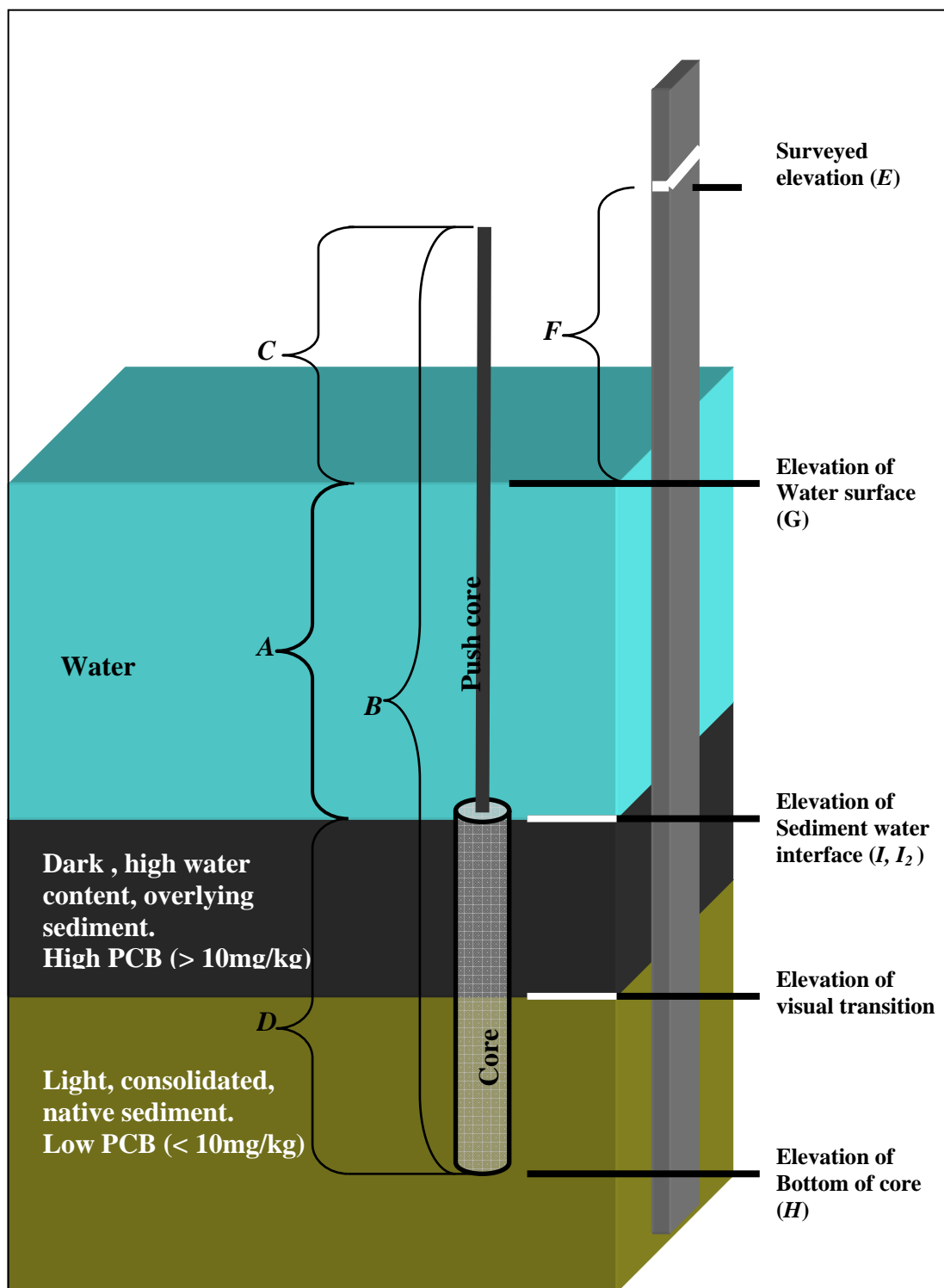


Figure 8. Graphical Depiction of Sediment Core Measurements.



2.1.2 Harbor-wide Sampling

At the direction of USEPA and USACE, sediment sampling was performed at the OU3 Pilot Cap site and the proposed Boat House area.

OU3 Pilot Cap — Grab sampling was conducted at 17 sample locations at the OU3 Pilot Cap site (Figure 2) to collect surficial sediments for PCB analysis. A 0.04m² modified Van Veen grab was used to collect sediment samples. Sample locations were based on stations previously visited by ENSR/AECom on August 25, 2005, shortly after the completion of capping activities (ENSR, 2006). Bathymetric data collected just after the capping event revealed a series of ridges and valleys formed by placement of cap materials along an east-west axis. At the time of the 2005 bathymetry and sampling as much as a 4-foot difference in elevation existed amongst the topography at this site. The 2005 sediment sampling locations were positioned to achieve good spatial coverage over the site and to obtain data representative of the high and low spots existing in the sediment cap at that time.

The 2007 sampling coordinates were based on the 2005 sampling event; however, it was expected that local currents and wave action may have resulted in a general smoothing of the topography over time. To achieve representative collections of ridge and valley locations, the vessel transited towards a target station on a heading that was perpendicular to the orientation of the ridges. As the target coordinates were approached the ridges and valleys were clearly discernable on the fathometer of the vessel. Depending on the station, either a valley or a ridge was targeted. As the appropriate feature emerged on the fathometer, a 10-lb lead weight attached to a line and surface float was thrown overboard to mark the feature. The vessel then transited back towards the location to confirm that the marker did, in fact, accurately mark the feature. If it did not, the method was repeated until successful (usually this was unnecessary). Once the feature was accurately marked, the surface grab sample was collected from that location and the actual sample coordinates were recorded. The surface 0.3 ft from each sample was homogenized and subsampled. One field replicate sample was also collected.

Boat House — Sediment cores were collected from 10 locations at the proposed Boat House area. Sediment cores were collected and processed as described in Sections 2.1.1 and 2.2, respectively. Sediment cores from multiple depth intervals were subsampled for PCB analysis. One sediment core was collected for replicate analysis.

2.2 Sample Processing

Sediment samples were kept on ice and transferred to the Sawyer Street trailer for processing, except for the progress-dredge cores which were processed on board the survey vessel and then discarded. Sediment samples were photo-documented, visually characterized, and subsampled for chemical and physical testing as described below. A summary of the samples collected is provided in Table 1.



Table 1. Sediment Samples Collected During the 2007 Sediment Monitoring Program. (a)

Sample Type	Number of Sediment Samples Collected		Number of Samples Sub-sampled for Chemical and Physical Testing				
	Sediment Cores	Sediment Grabs	PCB Congener	PCB Homologues	Grain Size	TOC	VOC
Pre-Dredge	50	0	0	0	0	0	0
Progress Dredge	135	0	0	0	0	0	0
Post-Dredge	55	0	38	4	38	38	2
OU3	0	17	18	2	0	0	0
Boat House	11	0	33	3	0	0	0

(a) Includes field replicates.

2.2.1 Photodocumentation

In general, previous investigations have shown that dark, high water content, organic silts in the surface sediment are associated with elevated PCBs (FWENC, 2001 and 2002; ENSR, 2004 and 2005). These sediments fall under the “OL” description in the USCS (organic silt, organic clay). At the Site these contaminated OL sediments generally overlie lighter colored, more consolidated native clays which have lower PCBs concentrations. The use of this visual transition as a general indicator of the vertical location of contamination provides a rapid and inexpensive method to assess dredge targets and performance.

To document this visual transition, all sediment cores were documented with digital photographs. Digital photographs of the cores were uploaded to the New Bedford Harbor project database. These photographs are linked in the database to the location information and to the analytical results and can be viewed individually. Each photograph contained the following elements in the frame:

- *The sediment core.* Photographing was done through the clear liner. Alternatively, for cores that were examined on deck with no collection of analytical subsamples, the cores were extruded from the core liner on deck for photographing. Also, for cores that did receive additional subsample processing, the core liners were cut open longitudinally to expose the sediment for sampling and photographing.
- *Measurement reference.* A tape measure (or equivalent) marked in decimal feet ran parallel to length of the core.
- *Sample identifier.* A card, paper, whiteboard, or equivalent was placed next to the core with the following written information:
 - o Sample ID – an alpha numeric code that identifies sample matrix, sampling year, station location, and depth interval sampled
 - o Sample Collection Date

2.2.2 Visual Characterization and Subsampling for Chemical and Physical Testing

Following photodocumentation, all sediment samples (cores, grabs) were visually characterized and subsampled for chemical and physical testing as described below. A summary of the samples collected for chemical and physical testing is provided in Table 1.

Each sediment core was visually characterized and physical characteristics, including material type, color, consistency, particle size, and odor, was documented on the Sediment Sampling Log forms. For sediment grabs, the material type was documented on the Sediment Sampling Log forms.



Pre-dredge Cores. The pre-dredge sampling plan included a subset of cores to be selected for PCB analysis. However, based on determinations by the project team (USACE NAE, Jacobs and Battelle) no samples were selected for analysis. Instead, each of the cores was archived frozen at the Site for possible analysis at a later date.

Progress-dredge Cores. Samples for chemical or physical testing were not required.

Post-dredge Cores. Sediment cores were subsampled for PCB congener, sediment grain size, and total organic carbon (TOC) analysis. Based on the visual characterization, a segment from top of the core to the visual interface was collected for analysis. A 6-inch segment below the visual interface was also sampled and archived frozen at the site for potential future analysis. The sediment was removed from the core using a disposable plastic spoon and homogenized in a disposable aluminum bowl. Dedicated processing equipment was used for each sample to minimize the potential for cross-contamination and reduce the use of solvents. Samples were collected into the appropriate containers and transferred on ice to Battelle. Samples for grain size and TOC analysis were shipped by overnight carrier to Applied Marine Sciences, of League, Texas. Samples for PCB analysis were transferred to the Battelle Laboratory Custodian. Copies of the sample field logs and custody records are maintained with the project files at Battelle.

A subset of the samples was also selected for PCB homologue analysis. The field team assigned samples for homologue analysis based on horizontal location within the sampling site to achieve a representative distribution of samples across the area.

Two sediment cores (one sample plus one replicate core) were also collected at station AA22, located within Area H but outside the area dredged, for volatile organic compounds (VOC) analysis (Table 1). The cores were cut open at the target sampling depth interval (0.2-0.3 ft from top of the core), and a 5-ml syringe was used to extract the sample for VOC analysis. For each sample, a series of subsamples were collected into pre-preserved vials prepared by the analytical laboratory (Alpha Woods Hole Group Laboratories). One vial contained methanol preservative, two of the vials contained deionized water preservative, and one vial contained no preservative. These replicate vials allowed the laboratory to select the appropriate sample based on interferences seen during the analysis.

OU3 Pilot Cap Sediment Grabs. The surface 0.3 ft from each sample was homogenized and subsampled for PCB congener analysis. A subset of the samples was also selected for PCB homologue analysis. Samples for PCB analysis were transferred to the Battelle Laboratory Custodian. Copies of the sample field logs and custody records are maintained with the project files at Battelle.

Boat House Cores. Each core was subsampled for PCB analysis. A total of three depth intervals were sampled, including 0-1 foot, 1-2 feet, and 2-3 feet. A subset of the samples was also selected for PCB homologue analysis. Samples for PCB analysis were transferred to the Battelle Laboratory Custodian. Copies of the sample field logs and custody records are maintained with the project files at Battelle.



2.3 Chemical and Physical Testing

Sediment samples (Table 1) were analyzed for PCB congeners and homologues, VOCs, grain size composition and TOC content as described below.

2.3.1 Polychlorinated Biphenyls

PCB analyses of post-dredge, OU3, and Boat House sediment samples were performed by Battelle, located in Duxbury, MA. Samples were air-dried overnight to ensure percent solids in the samples were >50%. Approximately 5 g of the air-dried sample was spiked with surrogates and extracted using Accelerated Solvent Extraction (ASE) following modified EPA Method 3545. The extracts were processed through activated copper for sulfur removal and then received disposable Florisil column clean-up. The post-Florisil extract was concentrated, fortified with internal standards (IS), and submitted for analysis.

All sample extracts were analyzed for the 18 NOAA PCB congeners using gas chromatography/electron capture detection (GC/ECD) using dual column confirmation, following modified EPA Method 8082. Sample data were quantified by the method of internal standards, using the IS compounds. Positive congener results were confirmed by a secondary column confirmation analysis with the higher of the two results reported, unless analyst discretion required otherwise (e.g. the result without an interference signal was reported).

A sub-set of the samples were also analyzed for PCB homologues using gas chromatography/mass spectrometry (GC/MS), following modified EPA Method 8270C. Sample data were quantified by the method of internal standards, using the IS compounds.

PCB congener and homologue results are reported in mg/kg dry weight and to two significant figures in this report. Concentrations of total PCB were calculated using the congener and homologue results. First, total PCB was calculated as the sum of the 18 NOAA congeners multiplied by the project-specific factor of 2.6. Next, total PCB was calculated as the sum of the homologues. A value of zero (0) was used in the summation for non-detects.

A routine set of quality control (QC) samples were prepared with each batch of 20 or fewer project samples to monitor data quality in terms of accuracy and precision. Each batch of project samples included one method blank, one laboratory control sample (LCS), and one matrix spike and matrix spike duplicate (MS/MSD).

2.3.2 Volatile Organic Compounds

VOC analyses of the post-dredge sediment core (collected at station AA22, an area of the harbor that was not dredged) were performed by Alpha Woods Hole Labs in Mansfield, MA. Samples were extracted following EPA Method 5035 and analyzed by GC/MS following EPA Method 8260B. Results are reported in mg/kg dry weight.

One trip blank was also submitted along with the field samples. Laboratory-based QC samples included analysis of one method blank, one LCS and LCS duplicate, and one MS/MSD.



2.3.3 Grain Size and Total Organic Carbon

Grain size and TOC analyses of the post-dredge sediment cores were performed by Applied Marine Sciences, Inc. of League, TX. Grain size analyses were performed according to ASTM Method D422 and reported as percent gravel, sand, silt and clay. Quality control for grain size analyses included analysis of an analytical duplicate. Total Organic Carbon (TOC) was analyzed by EPA Method 9060 and reported as percent dry weight. Quality control for TOC included analysis of an analytical duplicate.



3.0 RESULTS

3.1 Field Activities

Results from the field activities conducted during the 2007 remedial dredge season are described below. Complete field data are documented on the Sediment Sampling Log forms provided in Appendix A. Digital photographs of the cores were uploaded to the New Bedford Harbor project database. These photographs are linked in the database to the location information and to the analytical results and can be viewed individually. Further details about dredging activities are provided in Jacobs (2008).

3.1.1 Dredging and Field Monitoring Summary

Dredging was conducted from August to October 2007. Dredging was performed at Area H, which encompasses sections of DMU-9 and DMU-10, and DMU-11 and Area G, which encompasses sections of DMU-1 and DMU-102. The eastern portion of Area G (in DMU-102) is intertidal. As a result, dredging could not always be conducted during lower tides. To maintain efficiency a second dredge was set up. When low water prevented dredging in Area G, dredge crews moved over to the second dredge. This approach meant that the dredging location was variable from day to day and even within days. Weekly bathymetric data and sediment core samples were collected to provide feedback to the dredge operators in areas where dredging had been conducted to determine the need for clean up passes. Based on these data, dredgers did not return to previously dredged areas to perform clean up passes. Dredging in Areas G and H was conducted in a North-South orientation during most of the dredging season. During the last two weeks of dredging at Area H, dredging was conducted East-West in the eastern portion of the dredge area only.

Dredging was performed using a Mud CatTM hydraulic dredge equipped with a horizontal auger (Figure 9). The dredge was propelled by winching itself along a traverse cable which spans the dredge area to opposite sides of the perimeter cable. As a pass was completed, support crews relocated the cable to position for the next pass. The auger on the dredge is eight-ft wide. Six foot wide dredge passes were conducted. This provided two feet of overlap into the previous pass to capture any residual sediment which may have sloughed into the new cut. Dredge material was pumped through a pipeline to a booster pump, then to the desanding facility at Sawyer Street. Following desanding, the remaining fine material was pumped via a separate pipeline to the dewatering, treatment, and handling facility in the Lower Harbor. In total, the 2007 dredging removed over 23,300 cubic yards of material (Jacobs, 2008).



Figure 9. Mud CatTM Hydraulic Dredge.

The hydraulic dredge can not handle large debris which is common in this portion of the harbor. Debris removal was accomplished by 'raking' the bottom with a barge-mounted excavator



(Figure 10). Barges secured to the side of the debris removal platform stored the debris and were moved offsite as needed. Support boats were used throughout the operation to transport crews, maintain dredges, handle the pipeline, and move barges.

Dredging related sediment sampling included collection of sediment cores prior to, during and upon completion of dredging activities. In addition to these dredge related sampling events, sediment grab samples were collected at the OU3 Pilot Cap site outside the New Bedford hurricane barrier and sediment core samples were collected at the proposed Boat House location. Results from all of these sampling activities are provided below.



Figure 10. Debris Removal Excavator.

3.1.2 Pre-dredge Core Sampling

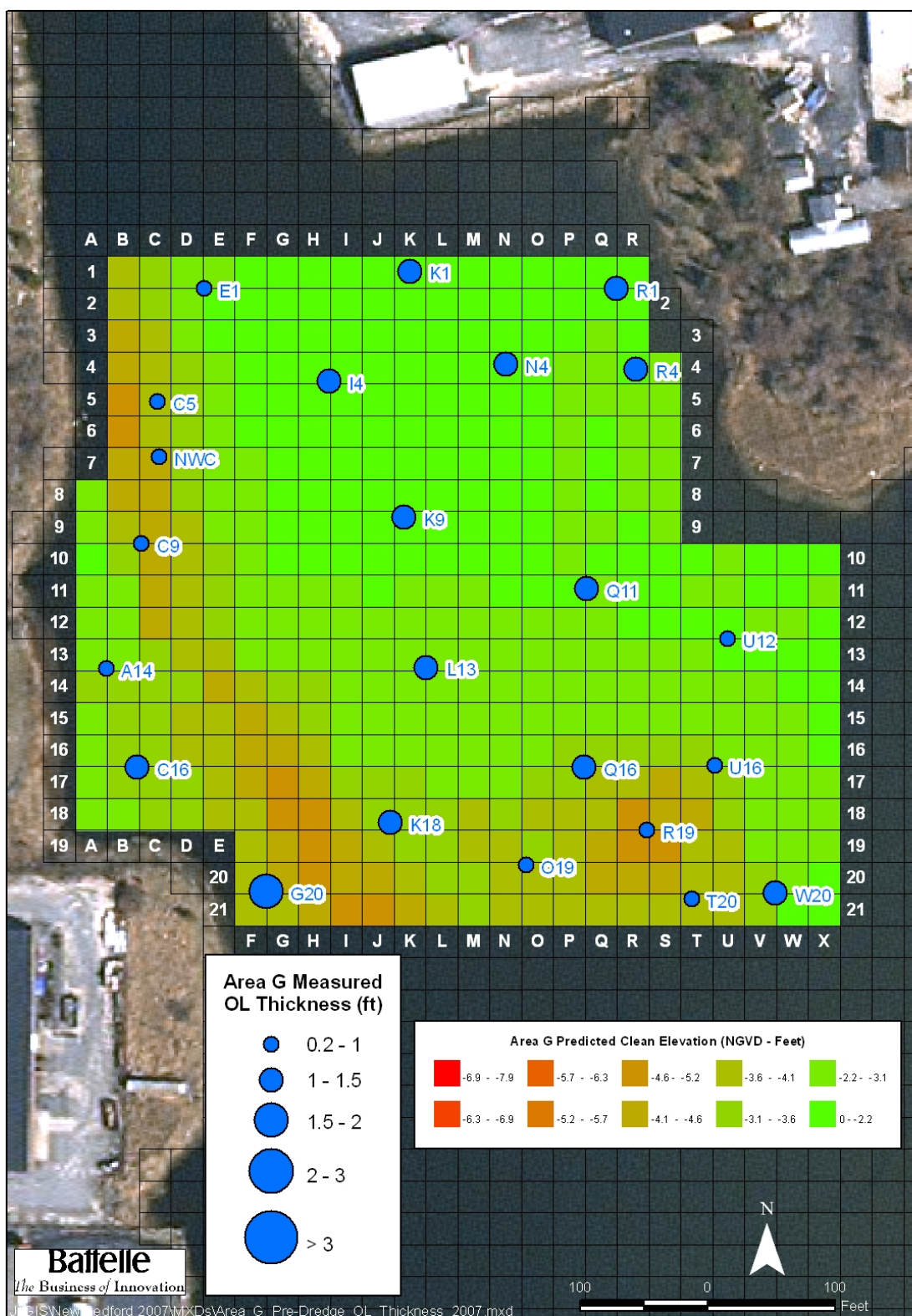
A total of 50 pre-dredge cores were collected at Area G (Figure 6) and Area H (Figure 7) in June and July, 2007. Core locations spanned the horizontal extent of the planned dredge areas. Results from the pre-dredge sampling effort consisted of vertical elevation data based on physical measurements and visual characterization of the sediment cores. Table 2 lists the relevant elevation data from the pre-dredge sampling event, including elevation of the visual transition and thickness of the OL layer. Figures 11 and 12 show the thickness of the OL layer overlaid on the target dredge elevations.

The physical characteristics of the pre-dredge cores were typical of sediments previously described at the site. The cores were generally comprised of two distinct layers. The surface layer is comprised of very fine-grained loose black organic silt with very high moisture content ('OL' in the USCS). This surface layer ranged from about 0.2 to 5.1-ft of OL (Table 2), with the thickest sediments found along the western shoreline of Area H (Figure 12). Below this OL layer the sediment type was generally moderately stiff olive-gray clay ('OH' in the USCS, defined as organic clay, organic silt). At Area G (upriver of Aerovox facility) the upper sediment layer was fairly uniform in thickness (Figure 11). At Area H (downriver of Aerovox facility) an increased sediment thickness was observed, which generally related to deeper target dredge elevation depths with thicker OL layers on the western side of the river (Figure 12). Elevation and sediment thickness data from the pre-dredge sampling was provided to NAE and Jacobs. These data were used to modify target dredge elevations for the final 2007 dredge plan (Jacobs, 2008).



Table 2. Elevation Data From the Pre-dredge Sampling Event.

Dredge Area	Station	Northing NAD 83 MA, ft	Easting NAD 83 MA, ft	Elevation of visual transition (native to OL) (NVGD, ft)	Thickness of Remaining Sediment (ft)
Area G	A14	2707464.30	815561.50	-2.40	0.90
	C16	2707387.11	815585.30	-2.40	1.30
	C5	2707673.60	815601.40	-3.40	0.60
	C9	2707562.30	815588.80	-4.30	1.00
	E1	2707762.50	815638.30	-1.80	0.20
	G20	2707289.56	815686.83	-4.40	1.90
	I4	2707689.90	815736.10	-1.90	1.10
	K1	2707776.10	815799.75	-1.90	1.30
	K18	2707343.84	815784.60	-3.40	1.50
	K9	2707582.87	815795.10	-2.10	1.10
	L13	2707465.40	815812.60	-2.90	1.40
	N4	2707703.10	815874.90	-2.20	1.40
	O19	2707310.65	815891.12	-2.90	0.60
	Q11	2707527.20	815938.30	-2.40	1.30
	Q16	2707387.30	815936.40	-2.90	1.30
	R1	2707762.50	815961.50	-1.80	1.20
	R19	2707337.70	815985.90	-2.60	0.80
	R4	2707698.80	815976.90	-2.10	1.40
	T20	2707283.63	816020.72	-3.20	1.00
	U12	2707487.50	816049.10	-2.20	0.90
	U16	2707388.20	816038.80	-2.30	0.90
Area H	W20	2707288.30	816086.07	-3.40	1.10
	AA22	2704885.60	815001.70	-7.90	4.90
	AAA28	2704737.92	815639.02	-3.70	0.90
	AAA39	2704465.60	815638.40	-2.70	0.80
	CC24	2704851.10	815050.10	-5.90	1.90
	DD31	2704673.70	815074.10	-7.20	2.60
	DD34	2704599.90	815073.40	-7.60	2.50
	DD37	2704523.50	815073.10	-7.90	2.70
	DD40	2704450.10	815074.80	-9.50	5.10
	FF23	2704876.90	815123.30	-5.50	0.90
	FF28	2704737.10	815111.20	-5.30	1.30
	GG33	2704624.80	815149.50	-5.30	1.00
	GG35	2704563.90	815138.40	-5.40	0.90
	II39	2704472.10	815200.90	-5.60	0.90
	JJ26	2704787.20	815212.70	-4.90	1.00
	KK32	2704649.80	815248.80	-5.30	1.00
	LL23	2704874.80	815273.60	-4.80	0.70
	MM25	2704812.10	815311.20	-5.00	1.00
	NN29	2704711.60	815311.90	-5.20	1.00
	NWC	2707630.40	815603.10	-3.90	0.50
	OO36	2704550.90	815350.30	-5.60	1.10
	QQ26	2704799.10	815386.90	-5.60	1.50
	QQ40	2704449.20	815399.60	-5.40	1.20
	SS23	2704875.90	815448.90	-4.60	0.70
	UU30	2704686.40	815487.30	-5.10	1.20
	UU35	2704562.90	815487.50	-4.90	1.00
	VV26	2704798.70	815524.80	-4.70	1.00
	ZZ23	2704862.20	815613.40	-4.00	0.70
	ZZ34	2704598.25	815623.50	-3.60	0.80



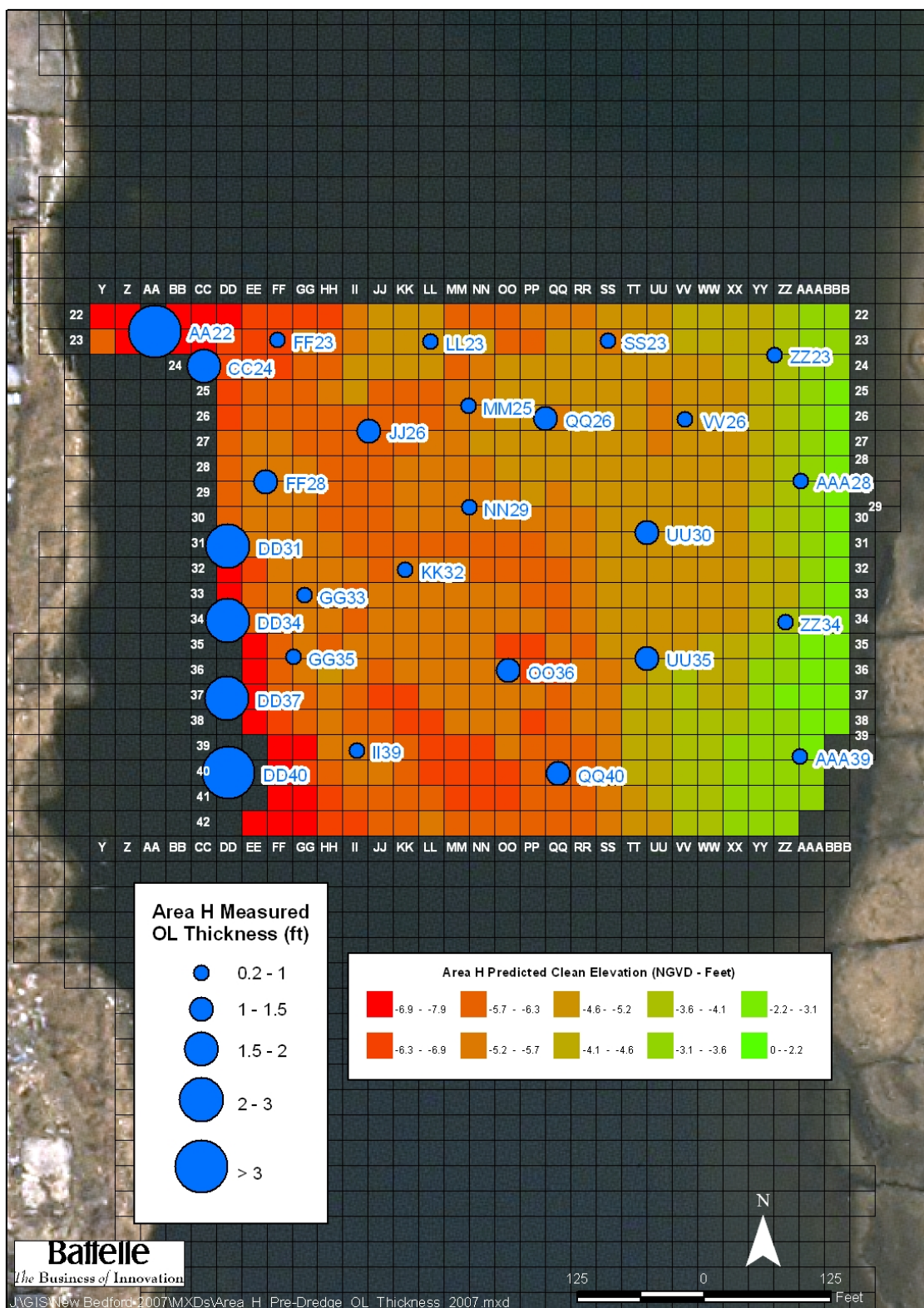


Figure 12. Pre-dredge Thickness of OL Layer at Area H.



3.1.3 Progress-dredge Sediment Sampling

Progress dredge samples were collected at Area G (Figure 6) and Area H (Figure 7) as needed during the 2007 dredge season to provide feedback regarding dredge progress and success. In general, progress-dredge sampling was conducted during each week of the dredge season, although during the early stages or when progress was slow, this sampling was not required. Progress-dredge core samples were processed (photodocumented and visually characterized) directly aboard the sampling barge for and then discarded.

Characterization and elevation measurements were targeted at identifying the elevation of the sediment-water interface and the visual transition from OL to OH. Elevation data for the progress-dredge cores are summarized in Table 3, and includes a comparison the actual vs. predicted transition elevation. This information was used by the dredge operators to confirm the amount and depth of remaining contaminated sediment. These elevation measurements were also useful in determining if areas were overdredged. Based on progress-dredge core results and the weekly bathymetric survey, dredge operators would have returned to areas to remove any remaining material, if needed. However, no additional passes were conducted during the 2007 dredge season.

Table 3. Elevation Data From the Progress-dredge Sampling Events.

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area G	H13	-2.8	-3.3	-1.9	1.4	-0.5
	H2	-1.6	-2	-1.9	0.1	-0.4
	I1	-1.6	-2.7	-2.3	0.4	-1.1
	I12	-2.7	-2.9	-2.4	0.5	-1.0
	I4	-1.6	-2.6	-2.3	0.3	-1.0
	I7	-1.9	-2.3	-2.1	0.2	-0.4
	J10	-2	-2.6	-1.9	0.7	-0.6
	J14	-2.7	-3.4	-2.9	0.5	-0.7
	J18	-3.3	-3.6	-3.1	0.5	-0.3
	J8	-2.1	-2.3	-2.1	0.2	-0.2
	K12	-2.6	-3.9	-2.6	1.3	-1.3
	K13	-2.7	-2.5	-1.8	0.7	0.2
	K16	-3	-3.5	-2.9	0.6	-0.5
	K19	-3.4	-3.9	-3.3	0.6	-0.5
	K2	-1.7	-3.1	-2	1.1	-1.4
	K21	-4.4	-5.3	-3.8	1.5	-0.9
	K5	-1.5	-3.3	-2.4	0.9	-1.8
	L3	-1.7	-2.9	-2.8	0.1	-1.2
	L7	-1.9	-3.1	-2.4	0.7	-1.2
	M12	-2.6	-3.8	-3.5	0.3	-1.2
	M12	-2.6	-4.2	-3.9	0.3	-1.6
	M13	-2.6	-2.9	-2.6	0.3	-0.3
	M15	-2.9	-3.9	-3.4	0.5	-1
	M17	-2.9	-4.4	-3.2	1.2	-1.5
	M20	-3.3	-4.5	-3.4	1.1	-1.2



Table 3. (cont)

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area G	M4	-1.7	-2	-2	0	-0.3
	M7	-1.9	-2.3	-1.7	0.6	-0.4
	N10	-2	-3.7	-3.2	0.5	-1.7
	N14	-2.8	-4.4	-3.9	0.5	-1.6
	N17	-2.9	-4.1	-3.8	0.3	-1.2
	N2	-1.5	-3.5	-3.3	0.2	-2
	N21	-3.8	-4.2	-3.7	0.5	-0.4
	N4	-1.7	-3.9	-3.1	0.8	-2.2
	N6	-1.8	-3.3	-3.2	0.1	-1.5
	N8	-2	-3.3	-3.1	0.2	-1.3
	O1	-1.4	-3.3	-2.8	0.5	-1.9
	O4	-1.8	-2.75	-2.7	0.05	-0.95
	O8	-1.9	-3.1	-2.8	0.3	-1.2
	P10	-2.5	-3.3	-2.9	0.4	-0.8
	P12	-2.2	-2.6	-2.4	0.2	-0.4
	Q3	-2.2	-3.6	-2.7	0.9	-1.4
	Q6	-2	-3.3	-3	0.3	-1.3
	Q9	-2.5	-3	-2.9	0.1	-0.5
Area H	AAA30	-3.3	-4	-3.3	0.7	-0.7
	BBB23	-3.1	-3.1	-2.4	0.7	0
	BBB27	-2.8	-3	-2.5	0.5	-0.2
	DD22	-7.2	-8	-6.6	1.4	-0.8
	DD24	-5.8	-7.3	-6.3	1	-1.5
	DD27	-5.8	-6.9	-6.1	0.8	-1.1
	DD31	-7.2	-8.1	-6.5	1.6	-0.9
	DD31	-7.2	-7.6	-5.6	2	-0.4
	DD32	-7.5	-10.4	-9.7	0.7	-2.9
	DD34	-8	-8.3	-7.4	0.9	-0.3
	DD35	-8.2	-10	-9.3	0.7	-1.8
	DD36	-8.5	-9.3	-8.3	1	-0.8
	DD40	-9.5	-10.6	-9.4	1.2	-1.1
	EE32	-6.6	-7.4	-6.1	1.3	-0.8
	EE41	-8.4	-9.4	-7.3	2.1	-1
	FF23	-6.3	-5.4	-4.9	0.5	0.9
	FF26	-5.9	-6.4	-5.8	0.6	-0.5
	FF28	-5.4	-5.3	-4.9	0.4	0.1
	FF34	-5.7	-7	-6.4	0.6	-1.3
	FF38	-6.3	-6.8	-6.2	0.6	-0.5
	GG25	-5.8	-5.8	-5.5	0.3	0
	GG29	-5.4	-5.5	-4.9	0.6	-0.1
	GG33	-5.5	-6.5	-5.4	1.1	-1
	GG33	-5.5	-6.3	-5.8	0.5	-0.8



Table 3. (cont)

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area H	GG35	-5.6	-6.8	-6.1	0.7	-1.2
	GG38	-5.8	-6.9	-6.6	0.3	-1.1
	GG40	-6.4	-7	-6.1	0.9	-0.6
	HH22	-6.7	-6.7	-5.9	0.8	0
	HH28	-5.9	-6.4	-5.6	0.8	-0.5
	HH35	-6.1	-6.9	-6.4	0.5	-0.8
	HH37	-5.2	-6.4	-6.3	0.1	-1.2
	HH41	-6.4	-6.6	-6.2	0.4	-0.2
	HH42	-6.5	-7.3	-6.7	0.6	-0.8
	II25	-5.1	-6.6	-6	0.6	-1.5
	II31	-6	-6.4	-5.4	1	-0.4
	II35	-5.4	-6.7	-5.6	1.1	-1.3
	II39	-5.3	-6.9	-6.1	0.8	-1.6
	II41	-5.9	-6.7	-6	0.7	-0.8
	JJ23	-5	-6.6	-5.9	0.7	-1.6
	JJ26	-5.8	-6.3	-5.7	0.6	-0.5
	JJ29	-5.9	-7	-5.9	1.1	-1.1
	JJ33	-5.3	-7.2	-6.5	0.7	-1.9
	JJ42	-6.1	-7	-6.6	0.4	-0.9
	KK27	-5.9	-7	-5.8	1.2	-1.1
	KK32	-5.3	-7.7	-6.8	0.9	-2.4
	KK37	-6.3	-6.7	-6.4	0.3	-0.4
	LL26	-5.8	-6.2	-6	0.2	-0.4
	LL32	-5.3	-6.4	-5.7	0.7	-1.1
	LL33	-5.4	-6.6	-6.1	0.5	-1.2
	LL34	-5.5	-5.5	-5.2	0.3	0
	LL36	-5.5	-5.6	-5	0.6	-0.1
	LL36	-5.5	-6.8	-6.2	0.6	-1.3
	LL40	-6.3	-4.8	-4.6	0.2	1.5
	LL40	-6.3	-7.3	-6.3	1	-1
	LL42	-5.5	-4.2	-4.1	0.1	1.3
	MM22	-5.8	-7	-5.9	1.1	-1.2
	MM24	-5.7	-7.3	-6.2	1.1	-1.6
	MM29	-5.3	-6.5	-6.1	0.4	-1.2
	NN24	-5.6	-5.6	-5.1	0.5	0
	NN29	-5.3	-5.7	-4.8	0.9	-0.4
	OO26	-4.7	-6	-5.6	0.4	-1.3
	OO32	-5.9	-6.3	-5.1	1.2	-0.4
	OO38	-5.6	-7	-6.4	0.6	-1.4
	OO42	-6.2	-7.1	-6.2	0.9	-0.9
	PP22	-5.6	-5.9	-5.7	0.2	-0.3
	PP30	-5.3	-6.1	-5.4	0.7	-0.8



Table 3. (cont)

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area H	PP36	-6.4	-6.5	-6.4	0.1	-0.1
	PP40	-6.2	-6.6	-6.4	0.2	-0.4
	QQ25	-4.6	-5.3	-4.8	0.5	-0.7
	QQ30	-5.2	-6	-5.4	0.6	-0.8
	QQ32	-5.7	-6	-5.6	0.4	-0.3
	QQ33	-5.7	-6.8	-6.6	0.2	-1.1
	RR22	-5.5	-5.4	-4.9	0.5	0.1
	RR27	-4.6	-5.2	-5	0.2	-0.6
	RR35	-5.8	-5.3	-5.1	0.2	0.5
	RR39	-5.8	-5.5	-5.1	0.4	0.3
	RR41	-5.9	-6.1	-5.6	0.5	-0.2
	SS23	-5.5	-6.1	-5.6	0.5	-0.6
	SS29	-5	-6.2	-5.4	0.8	-1.2
	SS38	-5.2	-5.6	-5.2	0.4	-0.4
	TT26	-5	-5.6	-5	0.6	-0.6
	TT30	-4.9	-5.6	-5	0.6	-0.7
	TT31	-5	-5.8	-5.2	0.6	-0.8
	TT36	-5	-5.3	-4.7	0.6	-0.3
	TT42	-5	-5.5	-4.8	0.7	-0.5
	UU22	-4.8	-5.4	-5.2	0.2	-0.6
	VV27	-4.6	-5.4	-5.1	0.3	-0.8
	WW24	-4.7	-5.4	-4.6	0.8	-0.7
	WW29	-4.7	-4.7	-4.7	0	0
	YY22	-4.1	-4.4	-4.3	0.1	-0.3
	YY28	-4.1	-4.9	-4.4	0.5	-0.8
	ZZ25	-3.7	-4.3	-4	0.3	-0.6

3.1.4 Post-Dredge Sediment Sampling

The post-dredge sampling event was conducted in November and December 2007 following the completion of dredge activities. This effort was conducted to verify the final sediment condition at the end of the 2007 dredge season. A total of 58 cores were collected during the post-dredge event at Area G (Figure 6) and Area H (Figure 7). Only six of the post dredge samples represented a revisit of pre-dredge locations for direct comparison of dredging performance. Table 4 lists the elevation data collected for the post-dredge core samples. Note that station AA22 was located just outside of the dredge area for 2007. Excluding station AA22, the average thickness of remaining contaminated sediment based on visual characterization of the post-dredge cores was 0.68-ft, with a range of 0.1 to 1.6-ft (Table 4).

The physical characteristics of the post-dredge cores had the same general characteristics as observed in the pre-dredge events. There were typically two distinct layers (OL overlying OH). However, as expected there were noticeable differences between the two events. As indicated by the



elevation results discussed above, the overall thickness of the OL was clearly decreased following completion of dredge activities. The visual transition zone in many of the post-dredge cores was also noticeably different from the pre-dredge cores. There were fewer cores with sharp demarcations between the OL and OH layers, and these blurred transitions tended to be thicker (>0.5-ft) than observed in pre-dredge cores.

Table 4. Elevation Data From the Post-dredge Sampling Event.

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area G	I1	-1.60	-2.3	-1.80	0.50	-0.70
	I4	-1.60	-2.3	-1.60	0.70	-0.70
	I7	-1.90	-1.9	-1.80	0.10	0.00
	J10	-2.00	-2.9	-2.20	0.70	-0.90
	J10-DUP	-2.00	-2.8	-2.10	0.70	-0.80
	J14	-2.70	-3.5	-2.90	0.60	-0.80
	J18	-3.30	-3.1	-2.80	0.30	0.20
	K2	-1.70	-2.6	-1.80	0.80	-0.90
	K21	-4.40	-5.5	-4.30	1.20	-1.10
	K5	-1.50	-2.8	-2.20	0.60	-1.30
	M12	-2.60	-3.5	-3.10	0.40	-0.90
	M17	-2.90	-3.9	-3.30	0.60	-1.00
	M20	-3.30	-3.2	-2.90	0.30	0.10
	M7	-1.90	-2.2	-1.80	0.40	-0.30
	N10	-2.00	-2.9	-2.50	0.40	-0.90
	N14	-2.80	-4.3	-3.80	0.50	-1.50
	N4	-1.70	-3.6	-3.00	0.60	-1.90
	O1	-1.40	-3	-2.40	0.60	-1.60
	P12	-2.20	-2.5	-2.20	0.30	-0.30
	Q6	-2.00	-2.7	-2.50	0.20	-0.70
	Q9	-2.50	-3.1	-2.60	0.50	-0.60
Area H	AA22	-8.00	-7.3	-3.60	3.70	0.70
	AA22 DUP	-8.00	-7.4	-3.50	3.90	0.60
	BBB23	-3.10	-3.3	-2.40	0.90	-0.20
	BBB34	-2.90	-3.4	-2.30	1.10	-0.50
	DD22	-7.20	-7	-5.90	1.10	0.20
	DD24	-5.80	-6.9	-5.70	1.20	-1.10
	DD31	-7.20	-7.5	-6.50	1.00	-0.30
	DD36	-8.50	-9.1	-7.90	1.20	-0.60
	DD36 DUP	-8.50	-9	-7.70	1.30	-0.50
	DD40	-9.50	-10.5	-8.90	1.60	-1.00
	EE41	-8.40	-8.8	-7.40	1.40	-0.40
	GG29	-5.40	-5	-4.40	0.60	0.40
	GG33	-5.50	-6.3	-5.70	0.60	-0.80
	HH22	-6.70	-7.1	-6.10	1.00	-0.40
	HH42	-6.50	-6.9	-6.10	0.80	-0.40



Table 4. (cont)

Dredge Area	Station (Z Block)	Elevation Measurements (NGVD ft)			Measured Sediment Thickness Remaining (ft)	Actual vs. Predicted Transition Elevation (ft)
		Target Dredge Elevation	Measured Elevation of Visual Transition (Native to OL)	Measured Elevation of Sediment Surface		
Area H	II25	-5.10	-6.2	-5.80	0.40	-1.10
	II36	-5.60	-6.5	-5.90	0.60	-0.90
	KK27	-5.90	-6.5	-5.60	0.90	-0.60
	KK32	-5.30	-6.9	-6.00	0.90	-1.60
	LL34	-5.50	-6.5	-6.40	0.10	-1.00
	LL40	-6.30	-6.7	-6.30	0.40	-0.40
	MM22	-5.80	-6.4	-5.90	0.50	-0.60
	MM29	-5.30	-7.8	-6.90	0.90	-2.50
	OO26	-4.70	-6	-5.30	0.70	-1.30
	OO32	-5.90	-6.1	-5.30	0.80	-0.20
	OO38	-5.60	-7	-6.50	0.50	-1.40
	OO42	-6.20	-6.6	-5.80	0.80	-0.40
	RR35	-5.80	-5.5	-5.20	0.30	0.30
	SS23	-5.50	-5.9	-5.60	0.30	-0.40
	SS29	-5.00	-6.1	-5.40	0.70	-1.10
	TT39	-4.50	-5.7	-5.40	0.30	-1.20
	VV34	-4.60	-5.2	-4.20	1.00	-0.60
	WW24	-4.70	-5.8	-5.00	0.80	-1.10
	WW29	-4.70	-4.8	-4.40	0.40	-0.10
	WW41	-3.70	-4.4	-3.80	0.60	-0.70
	XX37	-4.10	-5.1	-4.10	1.00	-1.00
	YY32	-4.50	-5	-4.80	0.20	-0.50

3.1.5 Harbor-wide Sampling

Sediment sampling was conducted at the OU3 Pilot Cap and proposed Boat House areas of the Harbor as described below.

OU3 Pilot Cap — Grab samples were collected at the OU3 Pilot Cap site in November 2007 from either ridge or valley locations as described in Section 2.2. Detailed bathymetry was conducted in 2005 and 2007 by Apex Engineering. It appears that there have been no substantive changes of the locations of these ridges and valleys since 2005. The physical characteristics of sediments from all locations sampled were generally similar. All of the samples had a thin (<1cm) light brown surface coating representative of an active algal layer. All samples were mostly fine sand. Based on the visual characterizations, the valley locations tended to have somewhat higher silt content than the ridge locations although this was not universally true.

Boat House — Sediment cores were collected in November 2007 at 10 locations offshore of the proposed Boat House location. Each sediment core was subsampled for PCB analysis at three depth intervals: 0-1 foot, 1-2 feet, and 2-3 feet, for a total of three samples per core. Most samples were comprised of black silt overlain by grey clay or sand ('OL' over 'OH' layer).



3.2 Chemical and Physical Testing

Results from the chemical and physical testing of sediment samples (Table 1) collected in support of the 2007 remedial dredge season are presented below. Complete test results are provided as appendices to this report. PCB results are provided in Appendix B, VOC results are provided in Appendix C, and sediment grain size and TOC results are provided in Appendix D.

3.2.1 Polychlorinated Biphenyls – Congeners

3.2.1.1 Post-dredge Sediments

Total PCB concentrations measured in post-dredge surface sediment samples collected at Areas G and H are summarized in Table 5. At Area G, total PCB concentrations ranged from 74 mg/kg to 660 mg/kg, with no clear distribution trend except that concentrations appeared to be lower in sediment sampled along the eastern boundary of the dredge area (Figure 13). At Area H, total PCB concentrations ranged from 5.4 mg/kg to 1,400 mg/kg, with the highest concentrations measured in fine-grained, organic-rich sediment sampled near the western boundary of the dredge area (Figure 14). Lower total PCB concentrations were measured in the sandy, low-TOC samples sampled near the eastern boundary at Area H (Figure 14).

Table 5. Total PCB in Post-dredge Sediment Samples, November and December 2007.

Area G			Area H		
Station ID	Sample Depth Interval (ft)	Total PCB ^a (mg/kg dry)	Station ID	Sample Depth Interval (ft)	Total PCB ^a (mg/kg dry)
N14-F07	0.0-0.5	74	WW24	0.0-0.8	240
I1	0.0-0.5	180	WW41	0.0-0.6	80
I4-F07	0.0-0.7	150	YY32	0.0-0.2	23
K2	0.0-0.8	100	BBB23	0.0-0.9	5.4
N4-F07	0.0-0.6	75	OO26	0.0-0.7	310
O1	0.0-0.6	660	OO32	0.0-0.8	280
Q9	0.0-0.5	100	OO38	0.0-0.5	160
J14	0.0-0.6	470	SS29	0.0-0.7	330
K5	0.0-0.6	250	VV34	0.0-1.0	370
J10	0.0-0.7	160	DD22 ^b	0.0-1.1	540
J10 (dup)	0.0-0.7	160	GG29 ^b	0.0-0.6	1400
K21	0.0-1.2	310	GG33-F07	0.0-0.6	300
M17	0.0-0.6	300	HH22	0.0-1.0	470
^{a,b} Sum of 18 congeners x 2.6 ^b Target Dredge Elevation was not reached at this location ^c Sediment was not dredged at this location			II25	0.0-0.4	250
			II36	0.0-0.6	400
			KK32-F07	0.0-0.9	290
			LL40	0.0-0.3	190
			MM22	0.0-0.5	300
			MM29	0.0-0.9	270
			DD31-F07	0.0-1.0	1100
			DD36	0.0-1.0	1000
			DD36 (dup)	0.0-1.0	910
			EE41	0.0-1.4	590
			AA22-F07 ^c	1.0-2.0	85
			AA22-F07 ^c (dup)	1.0-2.0	96

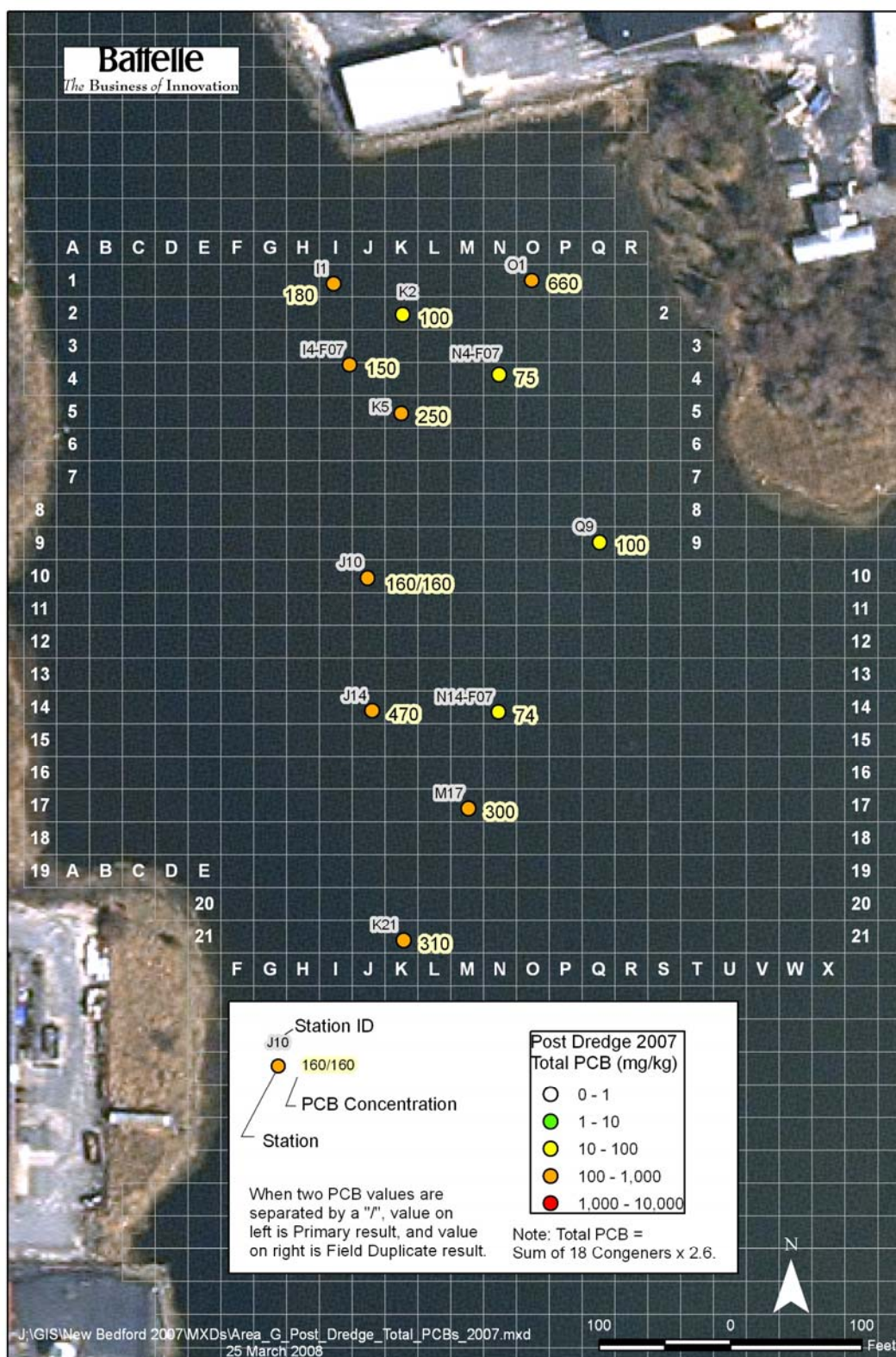


Figure 13. Total PCB in Post-dredge Sediment Samples at Area G, November and December 2007.

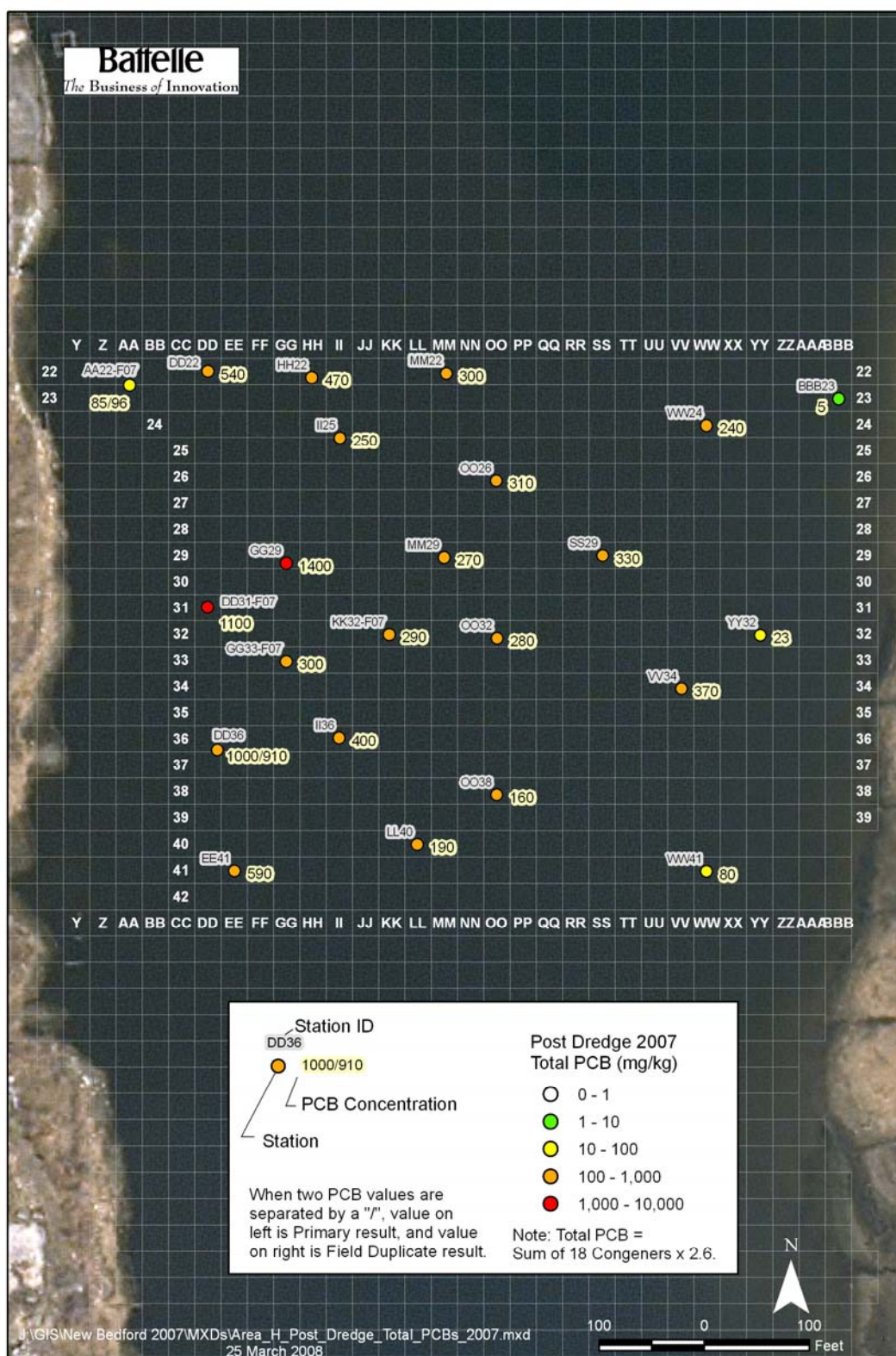


Figure 14. Total PCB in Post-dredge Sediment Samples at Area H, November and December 2007.



3.2.1.2 Harbor-wide Sediments

Total PCB concentrations measured in sediments at the OU3 Pilot Cap site and the proposed Boat House area of the Harbor in November 2007 are summarized in Table 6 and shown in Figure 15 (OU3 Pilot Cap) and Figure 16 (Boat House). Total PCB concentrations measured in surficial sediment (0-0.3 ft) samples at the OU3 Pilot Cap were fairly uniform across the spatial extent of the cap area, ranging from 0.24 mg/kg to 4.0 mg/kg (Table 6). Total PCB concentrations in surface (0-1 ft) sediments collected offshore from the proposed Boat House area ranged from 1.5 mg/kg to 250 mg/kg, and generally decreased with depth (Table 6, Figure 16). All but two of the deeper (>2-ft below surface) Boat House sediments had total PCB concentrations well below 1 mg/kg.

Table 6. Total PCB in OU3 Pilot Cap and Boat House Sediments, November and December 2007.

OU3 Pilot Cap			Boat House		
Station ID	Depth Interval (ft)	Total PCB ^a (mg/kg dry)	Station ID	Depth Interval (ft)	Total PCB ^a (mg/kg dry)
OU1	0.0-0.3	0.4	BH1	0.0-1.0	21
OU2	0.0-0.3	0.68		1.0-2.0	7.8
OU3	0.0-0.3	0.56		2.0-2.5	0.016
OU4	0.0-0.3	2.2	BH2	0.0-1.0	100
OU5	0.0-0.3	0.77		1.0-2.0	220
OU6	0.0-0.3	1.3		2.0-3.0	16
OU7	0.0-0.3	1.7	BH3	0.0-1.0	25
OU8	0.0-0.3	1.1		1.0-2.0	0.058
OU9	0.0-0.3	1.8		2.0-3.0	0.021
OU10	0.0-0.3	3.1	BH3 (dup)	0.0-1.0-REP	38
OU11	0.0-0.3	0.31		1.0-2.0-REP	0.2
OU12	0.0-0.3	2.8		2.0-3.0-REP	0.018
OU13	0.0-0.3	2.3	BH4	0.0-1.0	32
OU13 (dup)	0.0-0.3	1.3		1.0-2.0	6.4
OU14	0.0-0.3	1.8		2.0-3.0	4.2
OU15	0.0-0.3	3.1	BH5	0.0-1.0	29
OU16	0.0-0.3	4.0		1.0-2.0	0.38
OU17	0.0-0.3	0.24		2.0-3.0	0.04
^a Sum of 18 congeners x 2.6			BH6	0.0-1.0	250
				1.0-2.0	120
				2.0-3.0	0.5
			BH7	0.0-1.0	19
				1.0-2.0	0.25
				2.0-3.0	0.012
			BH8	0.0-1.0	1.5
				1.0-2.0	0.26
				2.0-3.0	0.29
			BH9	0.0-1.0	190
				1.0-2.0	5.9
				2.0-3.0	0.13
			BH10	0.0-1.0	32
				1.0-2.0	0.82
				2.0-2.8	0.023

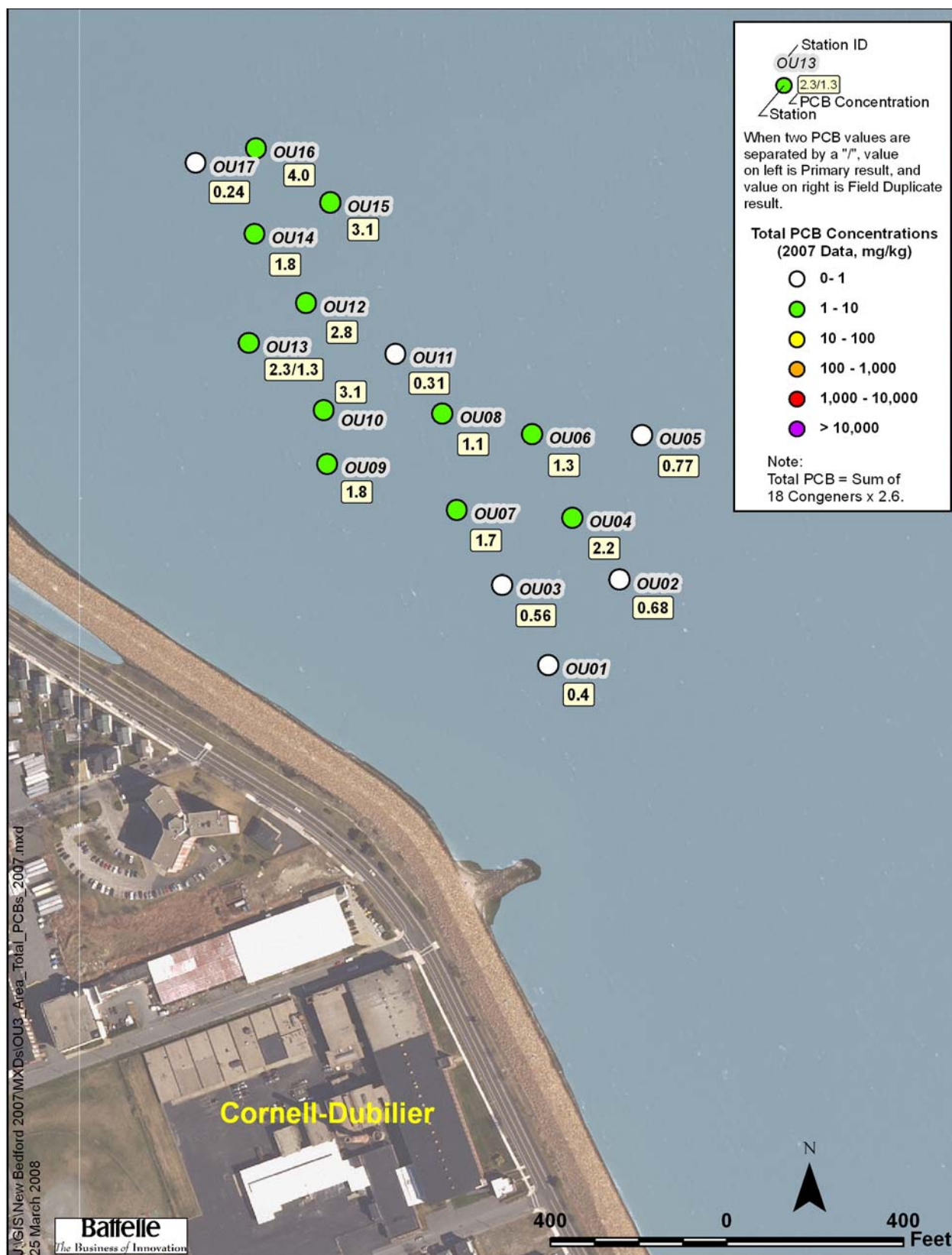


Figure 15. Total PCB in Surface Sediment at the OU3 Pilot Cap Site, November and December 2007.

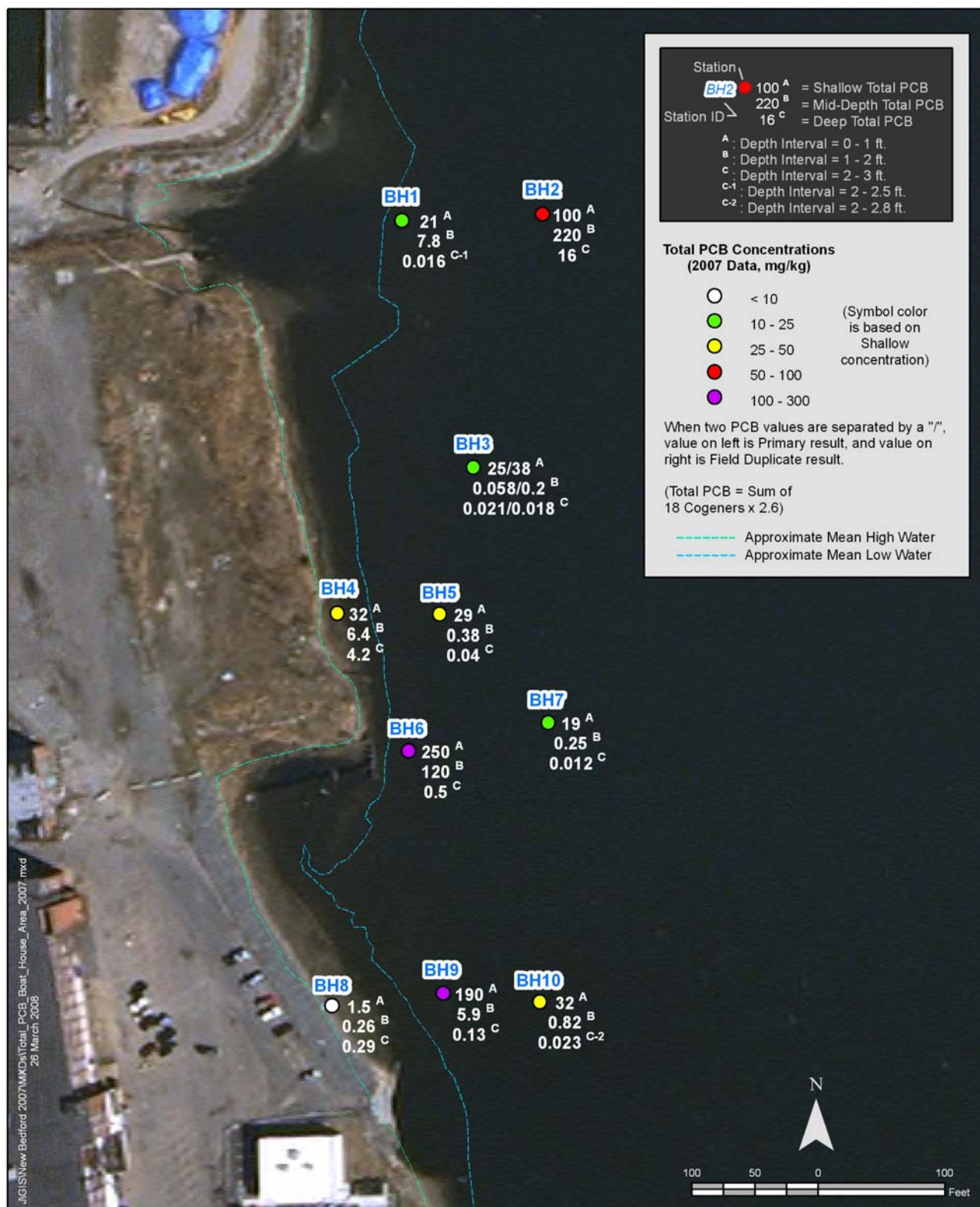


Figure 16. Total PCB in Sediment at the Boat House, November and December 2007.



3.2.1.3 Quality Control Results

Results from the field- and laboratory-based QC samples, described below, indicate that data quality is acceptable and the sample data are useable.

Field-based QC — Results from the field replicates for the post-dredge core, OU3 grab, and Boat House core samples were comparable. The relative percent differences (RPDs) between total PCB concentrations ranged from 0% to 12% for the post-dredge field replicates (Table 7), indicating representative samples were collected from a given location.

Total PCB concentrations between the field replicates collected at the OU3 Pilot Cap area were more variable (Table 7), which is probably associated with the overall lower concentration levels (<3 mg/kg).

Results from the replicate core sample collected at Boat House station BH3 were generally comparable. The RPDs between total PCB concentrations for the original and field replicate samples was 41% for the surface 0-1 ft sample, 110% for the 1-2 ft sample, and 15% for the bottom 2-3 ft sample (Table 7). The higher variability between total PCB concentrations for the 1-2 ft sample could be attributed to localized heterogeneity of the sediment material.

Table 7. Field Replicate PCB Results.

Sample Type and Area	Station ID	Sample Depth Interval (ft)	Total PCB ^a (mg/kg dry)		RPD
			Original	Field Duplicate	
Post-dredge, Area G	J10	0.0-0.7	160	160	0.0%
Post-dredge, Area H	DD36	0.0-1.0	1000	910	9.4%
	AA22-F07	1.0-2.0	85	96	12%
OU3 Pilot Cap	OU13	0.0-0.3	2.3	1.3	56%
Boat House	BH3	0.0-1.0	25	38	41%
		1.0-2.0	0.058	0.2	110%
		2.0-3.0	0.021	0.018	15%

^a Sum of 18 congeners x 2.6

Laboratory-based QC — Results from the routine QC samples analyzed with each batch of project samples indicated that the laboratory methods were in control. The procedural blanks were free of contamination. PCB congeners were recovered within the control limits (40% to 120%) in the LCS samples. While some of the target PCB congeners were not recovered well in the MS/MSD samples, the recovery data met the contingency criteria. That is, PCB congener concentrations in the MS/MSD were less than five times background due to the naturally elevated PCB levels in the native samples, and, as a result, the QC recovery criteria was not applicable. Surrogate compounds were generally recovered within the control limits (40% to 120%), although for some samples the surrogates were slightly over-recovered probably due to interference from the highly-contaminated native samples. In general, the impact of these minor QC exceedences on the overall data quality is minimal.



3.2.2 Polychlorinated Biphenyls – Homologues

Approximately 10% of the sediment samples analyzed for PCB congeners were also analyzed for PCB homologues. A comparison of the total PCB concentrations, calculated using both the congener and homologue data, is summarized in Table 8. PCB results for the North of Wood Street samples, which are evaluated in Battelle (2008), are also reported in Table 8. In general, total PCB concentrations calculated by the two methods are comparable. Samples with low concentrations of total PCB showed greater variability between the two measurements, whereas samples with higher concentrations (>5 mg/kg) agreed well. Neither the congener or homologue method consistently resulted in higher total PCB values, although the homologue method did frequently result in higher PCB concentrations for the more contaminated samples (>100 mg/kg) (Table 8).

Table 8. Total PCB Concentrations Calculated by Congener and Homologue Methods.

Sampling Area	Depth Interval (ft)	Total PCB (mg/kg dry)		RPD
		Sum 18 Congeners ^a	Sum Homologue ^b	
Boat House	0.0-1.0	1.5	2.2	38%
	1.0-2.0	0.26	0.28	7.4%
	2.0-3.0	0.29	0.071	121%
Post Dredging (Area G)	0.0-0.5	100	110	9.5%
	0.0-0.6	300	320	6.5%
Post Dredging (Area H)	0.0-0.9	270	290	7.1%
	0.0-1.4	590	620	5.0%
OU3	0.0-0.3	1.8	1.1	48%
	0.0-0.3	4	2.6	42%
North of Wood Street	0.0-0.5	7.4	6.9	7.0%
	0.0-0.5	29	30	3.4%
	0.0-0.5	270	160	51%

^a Sum of 18 congeners x 2.6, non-detect = 0 mg/kg.

^b Sum of 10 homologue groups, non-detect = 0 mg/kg

3.2.3 Volatile Organic Compounds

Complete test results for the single post-dredge core sample and field duplicate collected at station AA22 (Area H) are provided in Appendix C. Target VOCs were undetected in the post-dredge core sample, except for carbon disulfide and 2-butanone which were detected at low concentrations (<0.1 mg/kg dry).

Results from the field- and laboratory-based QC samples indicate that the sample data may be biased low.

Field-based QC — The precision between detected concentrations of VOCs in the field replicates was variable (40% and 55% RPD, see Appendix C). However, VOC concentrations were low in the field replicates which can contribute to the higher variability. Two common laboratory contaminants, acetone and methylene chloride, were detected in the trip blank. This resulted in positively-detected acetone results being “U” (non-detect) qualified in the two field samples. Methylene chloride was not detected in either sample.



Laboratory-based QC — Sample data may be biased low for some compounds and high for others based on the surrogate, LCS/LCSD, or MS/MSD results, as summarized below (see Appendix C for complete details). Sample data that are biased low or high are qualified (“J” or “R”) on the final data reports. Among the main contaminants of concern (i.e., trichloroethene, cis-1,2-dichloroethene, and vinyl chloride) there were no QC exceedances for cis-1,2-dichloroethene or vinyl chloride, whereas trichloroethene was under-recovered (53% and 58%) in the MS/MSD.

- Sample data for many of the target VOC compounds may be biased low because the compounds were under-recovered (<70%) in the MS/MSD samples. VOCs were generally recovered well in the LCS/LCSD, suggesting that the lower recoveries in the MS/MSD could be matrix related or associated with the low solids content (38.2%) of the native sample. While VOCs are not typically detected in marine sediment, the low bias evident by the MS/MSD results may have contributed to a higher frequency of non-detects in the two project samples.
 - For VOCs recovered between 10% and 70% in the MS or MSD sample, results in the native sample were qualified with a “J”, indicating results were estimated.
 - For VOCs recovered below 10% (cis-1, 3-dichloropropene, hexachlorobutadiene, trans-1, 3-dichloropropene, vinyl acetate, and 1, 2, 3-trichlorobenzene), results in the native sample were rejected (qualified with an “R”).
- Sample data for 1, 2-dichloroethane may be biased high based the elevated recovery of the surrogate compound 1, 2-dichloroethane-d4 (136% vs. upper QC limit of the 130%) in one sample. The impact to data quality, however, is minimal because this compound was undetected in the project samples.
- Sample data for 1,1-dichloroethene may be biased high because it was over-recovered (137%) in the LCSD. The impact to data quality, however, is minimal because this compound was undetected in the project samples. Moreover, this compound was recovered within the acceptance limits in the MS/MSD samples.
- Sample data for 2-butanone may be biased high because this compound was over-recovered (131%) in the LCSD sample. The impact to data quality, however, appears to be minimal because this compound was recovered within the acceptance limits in the MS/MSD samples.

3.2.4 Grain Size and Total Organic Carbon

Grain size and TOC results for the post-dredge sediment samples collected at Areas G and H are summarized in Table 9.

3.2.4.1 Sediment Grain Size

Grain size results were consistent with the sediment type observed during field collections, in that most surface samples were comprised of silty sediments (the majority of the samples had >80% fines). Silt was the predominant grain size fraction in all but four of the post-dredge sediment samples (sand was the predominant grain size fraction at stations K2, BBB23, WW41, and YY32; see Table 9). Grain size composition in surface sediments at Area G was dominated by silt, followed by roughly similar percentages of clay and sand for most samples. Grain size composition in surface sediments at Area H was dominated by silt, followed by clay and sand. All surface sediments had very low percentages of gravel (<7%).



3.2.4.2 Total Organic Carbon

TOC values ranged from 0.57% at station BBB23 to 14.89% at station AA22 (Table 9), and were frequently above 6% in most surface sediments.

Table 9. Post-dredge Sediment Grain Size and TOC Results, November and December 2007.

Dredge Area	Station ID	Depth Interval (ft)	Sediment Grain Size Fraction (% dry)					TOC (% dry)
			Gravel	Sand	Clay	Silt	Fines ^a	
Area G	I1	0.0-0.5	0.00	12.23	29.35	58.42	87.77	9.49
	I4	0.0-0.7	0.00	21.12	30.66	48.22	78.88	7.55
	J10	0.0-0.7	0.00	22.56	22.31	55.13	77.44	8.65
	J10 (dup)	0.0-0.7-REP	1.66	11.16	26.04	61.14	87.18	11.02
	J14	0.0-0.6	0.00	12.95	24.94	62.11	87.05	7.99
	K2	0.0-0.8	0.00	42.39	21.75	35.86	57.61	5.20
	K5	0.0-0.6	0.63	27.51	23.93	47.93	71.86	8.21
	K21	0.0-1.2	0.00	26.65	25.82	47.53	73.35	3.90
	M17	0.0-0.6	0.00	16.1	26.28	57.62	83.9	7.74
	N4	0.0-0.6	0.00	20.98	20.63	58.39	79.02	6.71
	N14	0.0-0.5	0.00	21.88	24.29	53.83	78.12	8.28
	O1	0.0-0.6	0.00	33.25	26.51	40.24	66.75	10.02
	Q9	0.0-0.5	0.00	12.43	30.05	57.52	87.57	7.61
Area H	BBB23	0.0-0.9	6.87	86.07	2.89	4.17	7.06	0.57
	DD22	0.0-1.1	0.00	7.87	32.77	59.36	92.13	8.70
	DD31	0.0-1.0	2.35	4.95	35.86	56.84	92.7	11.36
	DD36	0.0-1.0	0.00	4.82	36.04	59.14	95.18	12.50
	DD36 (dup)	0.0-1.1-REP	0.63	3.65	34.05	61.67	95.72	11.60
	EE41	0.0-1.4	0.00	5.53	40.24	54.23	94.47	11.47
	GG29	0.0-0.6	0.00	16.93	34.42	48.65	83.07	10.64
	GG33	0.0-0.6	0.21	13.04	37.29	49.46	86.75	5.45
	HH22	0.0-1.0	0.09	3.66	36.64	59.61	96.25	6.81
	II25	0.0-0.4	2.78	14.16	35.84	47.22	83.06	5.44
	II36	0.0-0.6	0.00	7.01	34.73	58.26	92.99	6.95
	KK32	0.0-0.9	0.00	4.96	36.32	58.72	95.04	6.07
	LL40	0.0-0.3	1.45	15.07	27.07	56.41	83.48	4.53
	MM22	0.0-0.5	0.00	3.75	37.00	59.25	96.25	6.19
	MM29	0.0-0.9	1.23	7.88	35.46	55.43	90.89	6.08
	OO26	0.0-0.7	2.20	15.59	35.79	46.42	82.21	6.04
	OO32	0.0-0.8	5.13	11.56	31.58	51.73	83.31	5.47
	OO38	0.0-0.5	0.00	12.84	39.52	47.64	87.16	4.50
	SS29	0.0-0.7	1.37	18.46	33.42	46.75	80.17	5.40
	VV34	0.0-1.0	0.00	16.95	37.06	45.99	83.05	6.38
	WW24	0.0-0.8	0.10	30.2	31.25	38.45	69.7	4.97
	WW41	0.0-0.6	3.37	63.14	12.82	20.67	33.49	2.64
	YY32	0.0-0.2	2.74	66.82	14.46	15.98	30.44	1.56
	AA22	1.0-2.0	0.00	13.16	26.77	60.07	86.84	14.89
	AA22 (dup)	1.0-2.0-REP	0.00	14.2	25.40	60.40	85.8	14.64

^a Fines = sum of silt and clay fractions.



3.2.4.3 Quality Control Results

Results from the field- and laboratory-based QC samples, described below, indicate that data quality is acceptable and the sample data are useable. Sediment grain size and TOC analyses were not planned for the 2007 dredge season, and, as a result, acceptance criteria for field- and laboratory-based QC samples are not defined in the project QAPP (Battelle, 2006a). Acceptance criteria of #50% RPD and #25% RPD were used to evaluate field- and laboratory-replicate QC results, respectively. The field-replicate precision criterion (#50% RPD) is based on criteria defined in the QAPP Addendum (Battelle, 2008) for other parameters (e.g., PCBs, TSS). The laboratory-replicate precision criterion (#25% RPD) is based on criteria defined by the laboratory.

Field-based QC —Results from the field replicate samples collected at stations J10, DD36, and AA22 were generally comparable. For sediment grain size, field replicate measurements agreed well for clay and silt fractions (RPDs < 15%) and were more variable for sand (RPDs ranged from 8% to 68%) and gravel (RPDs>200%) fractions (Table 10). The poor precision between replicate gravel measurements is attributed to the very low percentages measured in the sediment samples. For TOC, field duplicates agreed well with RPDs ranging from 2% to 24% (Table 10). Overall, the field replicate results suggested that representative samples were collected from a given location.

Table 10. Field Replicate Grain Size and TOC Results.

Sample Type and Area	Station ID	Sample Depth Interval (ft)	Parameter	Value (% dry)		RPD
				Original	Field Duplicate	
Post-dredge, Area G	J10	0.0-0.7	Gravel	0.00	1.66	200%
			Sand	22.56	11.16	68%
			Clay	22.31	26.04	15%
			Silt	55.13	61.14	10%
			TOC	8.65	11.02	24%
Post-dredge, Area H	DD36	0.0-1.0	Gravel	0.00	0.63	200%
			Sand	4.82	3.65	28%
			Clay	36.04	34.05	5.7%
			Silt	59.14	61.67	4.2%
			TOC	12.50	11.60	7.5%
	AA22	1.0-2.0	Gravel	0.00	0.00	N/A
			Sand	13.16	14.2	7.6%
			Clay	26.77	25.40	5.3%
			Silt	60.07	60.40	0.5%
			TOC	14.89	14.64	1.7%

Laboratory-based QC — Three laboratory duplicates were analyzed as laboratory QC samples. RPDs between the parent and laboratory duplicate samples were all less than 10% for the grain size and TOC analyses, indicating the precision of the analyses was in control.



4.0 DISCUSSION

4.1 Vertical Elevation Results Related to Dredging

The collection of pre-dredge core samples for visual characterization provided information necessary for effective dredge planning. Site-wide geostatistical modeling based on historical PCB data has been used to develop an estimation of the vertical elevation of PCB contamination in the sediments (target dredge elevation). The dredge plan for each year is based on the target dredge elevations and contours within the planned footprint of dredging. Changes in sediment condition over time or uncertainties in the model can result in a discrepancy between the target dredge elevation estimates and the existing features at the site. Elevation data based on visual characterization of cores collected in June 2007 were used to refine the dredge plan in terms of target dredge depths and thickness of the OL layer. These data were used to refine the dredge plan and as a result target dredge depths were reduced, thereby reducing dredging and disposal efforts. However, these adjustments were strictly based on the visual characterization of sediments and the transition from black silt (OL layer) to native clays (OH layer). As the remediation project continues, the relationship of this visual characterization to actual PCB concentrations will need to be continually reevaluated. At this point in the program, this method appears to be a relatively inexpensive and simple means to determine dredge depths thus maximizing funding towards remedial efforts.

During the course of dredging operators use benchmarked dGPS information for horizontal and vertical control. This allowed for accurate dredging operations and minimized both ineffective under-dredging and expensive over-dredging. However, variables such as wind and debris can result in incomplete dredging along dredge lines. The use of weekly bathymetric surveys and sediment core collections served as good checks for dredge performance and provided feedback to operators regarding areas that may require an additional dredge pass.

The collection of post-dredge cores provided a characterization of the post-dredge sediment condition relative to the pre-dredge condition as well as setting a baseline for recently dredged areas. This baseline informs the planning process for subsequent years and provides feedback regarding redeposition of sediments as a result of dredging or natural processes. Comparison of the visual characterization of the pre and post-dredge cores revealed that the depth of the sediment surface and the overall thickness of OL layers were reduced across all dredged regions. These were clear and expected results of the dredging. Other post-dredge observations related to the visual transition between sediment types were also apparent. For example, in many cases the post-dredge cores had less distinct visual transitions. In these cases the transitions occurred over a relatively broad band (>0.5-ft) of mixed sediment. In most of these cases it appeared that the visual transition zone may have been disturbed during dredge related activities. In most cases (50 out of 56), the elevation of the post-dredge visual transition also occurred at a deeper elevation than predicted. Overall it appears that dredging activity resulted in an increase in the target dredge elevation (mean = -0.73-ft, median = -0.70-ft).

For the 2007 program very few of the pre-dredge sampling stations were visited for post-dredge confirmation. Instead, post-dredge sampling locations were chosen based on areas of specific concern to determine final dredge performance. As a result the pre-post comparison made in previous seasons is inappropriate for these data. Nor can a pre-post comparison of PCB data be performed because the pre-dredge cores from 2007 were not analyzed for PCBs.

4.2 Relationship Between Sediment Properties and Total PCB in Post-Dredge Samples

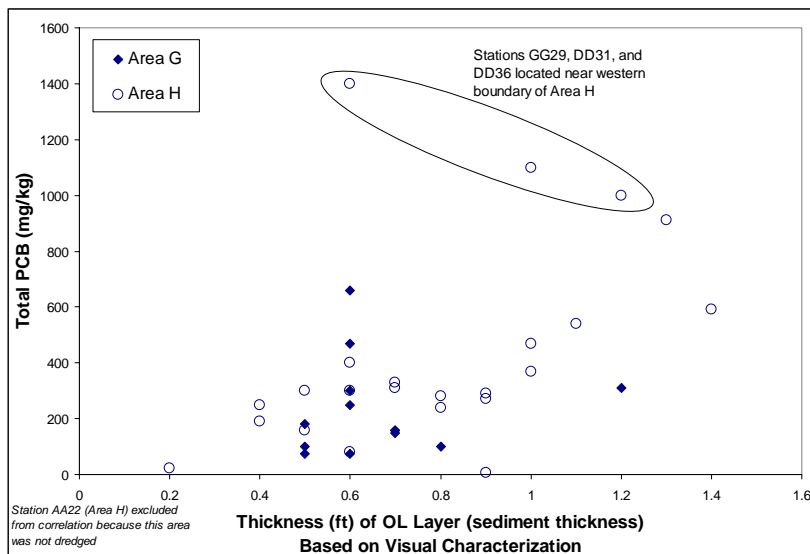


Figure 17. Correlation between Sediment Thickness and Total PCB in Post-dredge Surface Sediments, November 2007.

Total PCB concentrations in post-dredge surface sediments did not correlate with the thickness of the OL layer (amount of contaminated sediment remaining above the visual transition layer), especially at Area G (Figure 17). At Area H, the correlation is significant ($p < 0.001$, $r^2 = 0.5$) only if the highly-contaminated (total PCB > 1000 mg/kg) samples near the western boundary of the dredge area are excluded from the correlation. The thickness of the remaining OL layer at these western boundary locations was variable (Figure 17). Small amounts of dredge residuals and/or small-scale heterogeneity may have contributed to the elevated PCB signal at these locations.

Generally, increasing levels of organic carbon in marine sediments correlate with increasing amounts of fine-grained sediment fractions (i.e., silt and clay). Percent fines and TOC, however, were not strongly correlated in post-dredge surface sediments sampled at Area G (Figure 18). The poor correlation may be attributed to potential sediment mixing during dredging or an artifact of the narrow range in sediment types sampled (see Table 9, percent fines ranged from 58% to 88%). At Area H, where there was a wider range of sediment types (sandy to silty sediments with wide range of TOC values), the correlation between percent fines and TOC was significant ($p = 0.001$, $r^2 = 0.38$; Figure 18), albeit the r^2 value was not particularly strong.

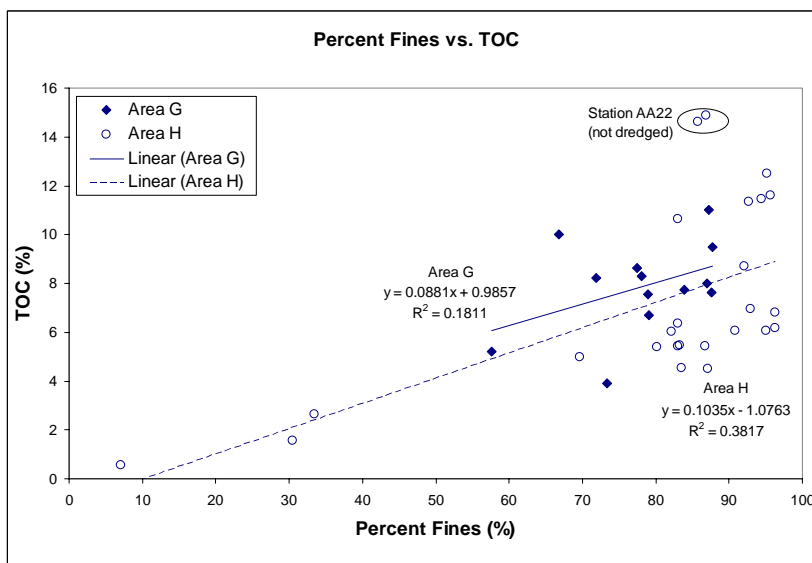


Figure 18. Correlation between Percent Fines and TOC in Post-dredge Surface Sediments, November 2007.



Total PCB concentrations did not correlate well with percent fines or TOC in post-dredge surface sediments sampled at Area G (Figure 19). The poor correlation may be associated with sediment condition (e.g., mixed, disturbed sediments) and/or the narrow range of sediment types sampled. Dredging and debris removal activities could potentially cause localized resuspension and redeposition of heterogeneous sediments with varying contamination history, resulting in sediment mixing in both horizontal and vertical directions. For instance, the fine-grained, less contaminated, deep sediments could have become resuspended to varying degrees, mixing with the more contaminated surface sediments with higher TOC.

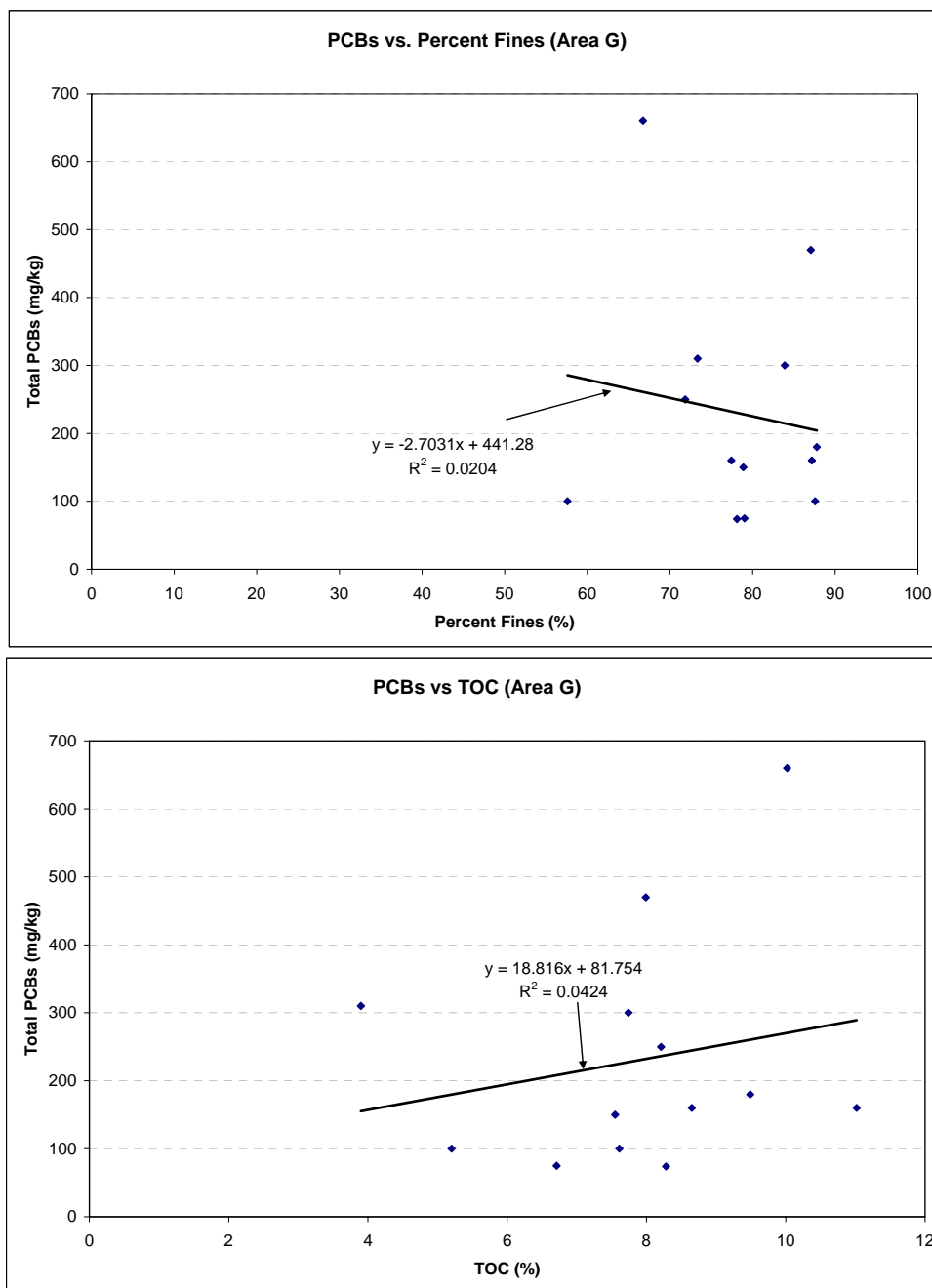


Figure 19. Correlation between Percent Fines and Total PCB (top) and TOC and Total PCB (bottom) in Post-dredge Surface Sediments at Area G, November and December 2007.



As was observed at Area G, total PCB concentrations in post-dredge surface sediments sampled at Area H did not correlate well with percent fines (Figure 20). The correlation against TOC, however, was significant ($p = 0.006$, $r^2 = 0.8$; Figure 20) which is not surprising because it is the organic content of the sediments that often influences chemical concentrations in the sediments (Hunt, 1979, Dayal *et al.*, 1981; 1983, Krom *et al.*, 1985, USACE, 1996). These results suggest that the surface sediments at Area H may be more homogenous compared to Area G, and that the contamination is influenced by the organic carbon content rather than sediment grain size.

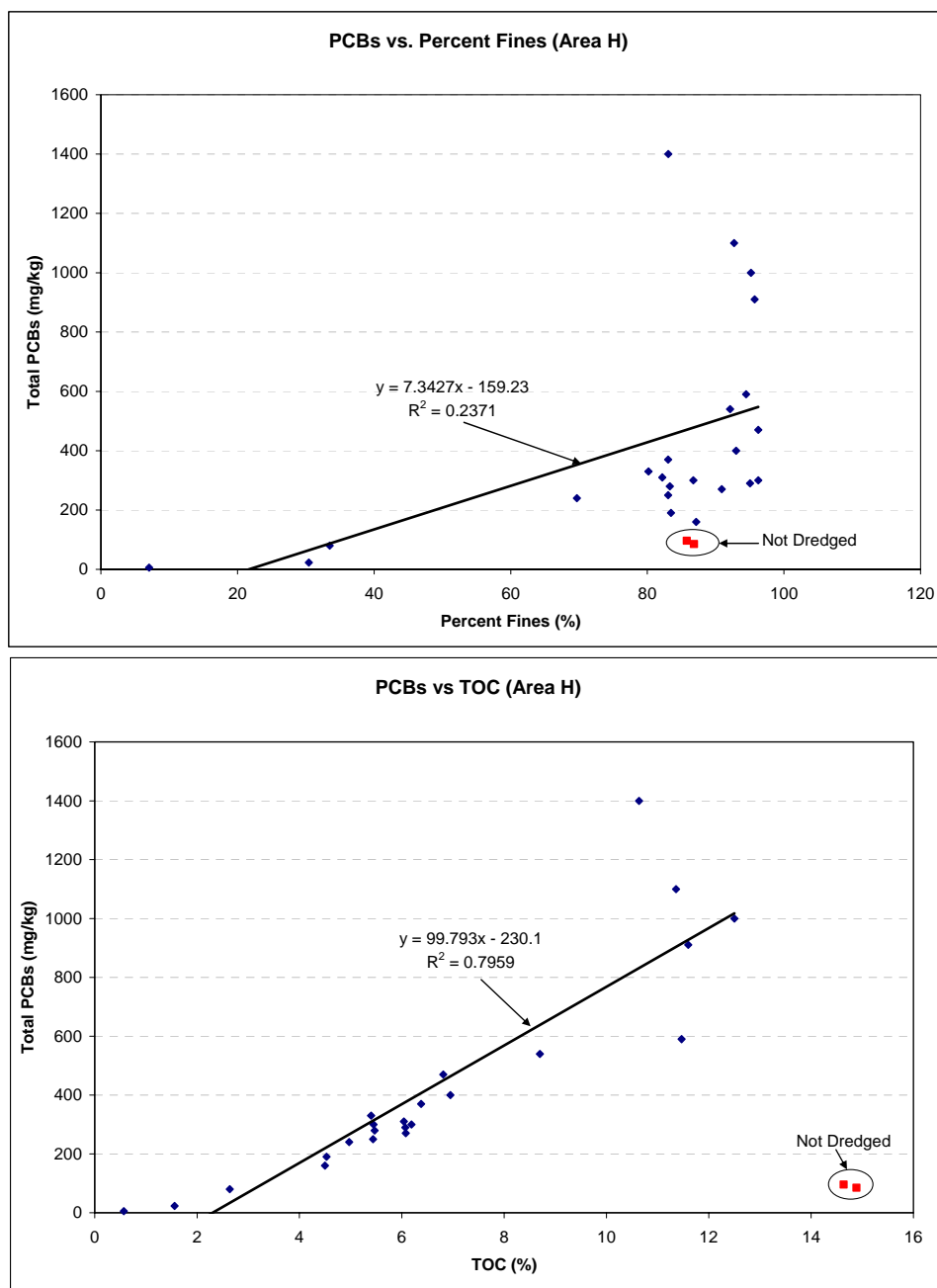


Figure 20. Correlation between Percent Fines and Total PCB (top) and TOC and Total PCB (bottom) in Post-dredge Surface Sediments at Area H, November and December 2007. (Sediments sampled at Station AA22, which was not dredged, were excluded from the correlation)



4.3 Temporal Trends in Total PCB at the OU3 Pilot Cap Site

The OU3 Pilot Cap site is a localized area of elevated PCB concentrations located outside the hurricane barrier in New Bedford, MA (Figure 2). In 2005 this area was capped with parent material dredged during the construction of a CAD cell in New Bedford Harbor. Annual monitoring has been performed since 2005 (shortly after completion of the capping activity) to determine the effectiveness of cap placement in lowering surficial sediment PCB concentrations, as well as the extent of change in PCB concentrations over time.

Temporal trends in total PCB concentrations in surficial sediments from 2005 to 2007 are shown in Figure 21. In general, total PCB concentrations are higher in surface sediments sampled at the valley locations compared to ridge locations (Figure 21). This is consistent with the visual characterization data, which indicated that the valley locations tended to have somewhat higher silt content than the ridge locations (Section 3.1.5). Total PCB concentrations in surface sediments sampled at ridge locations in 2007 are among the lowest measured since 2005 (Figure 21). Total PCB concentrations in surface sediments sampled at valley locations are frequently lower in 2006 and 2007 compared to 2005 (Figure 21). Overall, there have been no substantive changes in annual total PCB concentrations in surface sediment at the OU3 Pilot Cap site since 2005, although concentrations appear to increase over time at ridge station OU4 and decrease over time at valley stations OU7, OU12, OU13, and OU14 (Figure 21). The range of total PCB concentrations has narrowed in 2007 compared to 2005-2006 (0.36 mg/kg to 9.7 mg/kg in 2005; 0.41 mg/kg to 17 mg/kg in 2006; and 0.24 mg/kg to 4 mg/kg in 2007), which may suggest a possible “smoothing out” as a result of horizontal and vertical mixing of sediment material by local current and wave action. Overall, the OU3 PCB data suggest that the cap placement is still effective in this area.

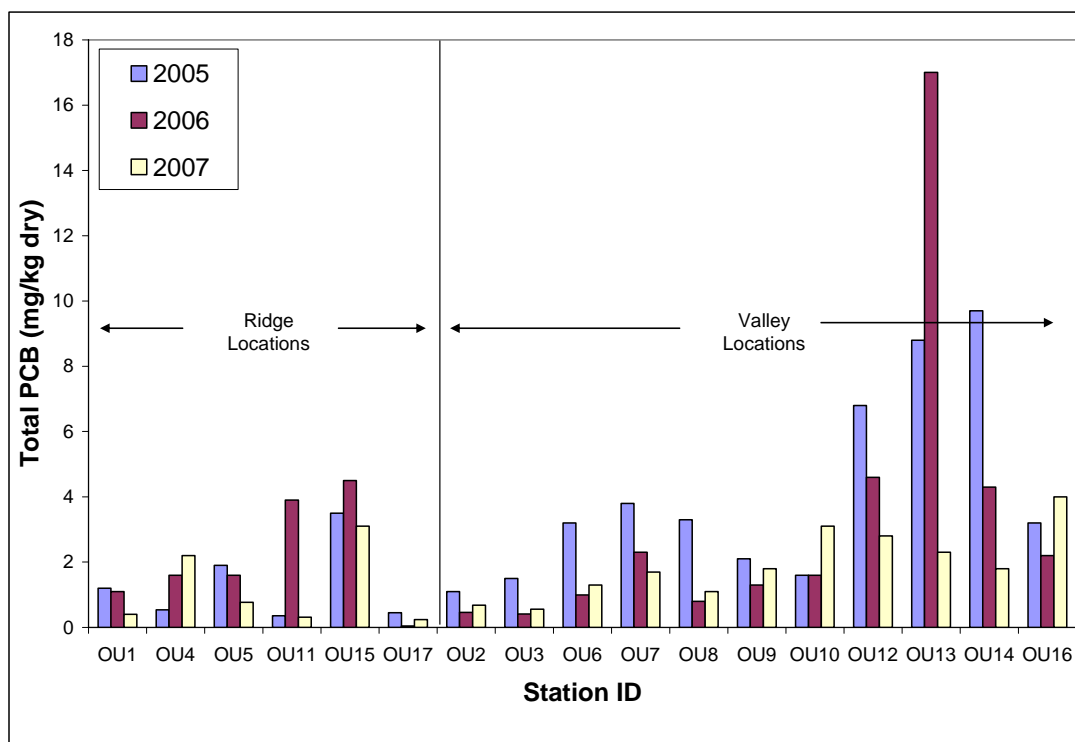


Figure 21. Total PCB in Surface Sediments Sampled at the OU3 Pilot Cap, 2005–2007.



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Appendix A

Field Sampling Logs

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Pre-dredge Sediments

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Station ID: K18 Time On Station: 1341 All measurements are ± 0.1 feet
 Core Sample ID: 5-079-PK18-08-19 Northing (NAD 83): 855784.60 Water Depth (A): 3.8' 3.7' ①
 Logged by: AM/mw Easting (NAD 83): 2707343.84 Length of push core assembly (B): 9.0'
 Collection Mechanism: Push-Core GPS Accuracy: 5.35 Water surface to top of handle (C): 3.2'
 Date: 6/6/07 Predicted Tide (ft): — Length of core (from bottom) (D): 1.9'
 Time of Collection: 1356 Surveyed elevation (NVGD 29) (E): 2.5' 2.2' ②
 Time Depart Station: 14:03 Water surface from surveyed elevation (F): —

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

2.0'
- 3.8
- 3.4
- 1.9
- 1.7
—

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.9'		Silt	Black	loose	fine			
0.4'		clay	Black/gray	stiff	fine			
0.0'			olive gray					

File ID of digital photograph(s):

Comments:

- ① Tide dropped while on station.
 ② Tide Board correction. Jacobs identified error in Tide board placement. impacted all cores collected on 6/6/07 by -0.17 (0.2')

[illegible]

Station ID:	<u>T20</u>	Time On Station:	<u>1428</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07A-0T20-00-19</u>	Northing (NAD 83):	<u>2707283.67</u>	Water Depth (A):	<u>3.5'</u>
Logged by:	<u>AW/mw</u>	Easting (NAD 83):	<u>816020.72</u>	Length of push core assembly (B):	<u>70'</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>4.94</u>	Water surface to top of handle (C):	<u>1.2'</u>
Date:	<u>6/6/07</u>	Predicted Tide (ft):	<u>✓</u>	Length of core (from bottom) (D):	<u>1.9</u>
		Time of Collection:	<u>1432</u>	Surveyed elevation (NVGD 29) (E):	<u>1.7'</u>
		Time Depart Station:	<u>1435</u>	Water surface from surveyed elevation (F):	<u>✓</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): *E - F*

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

[illegible]

8.2-

Battelle
The Business of Innovation

Project Name: New Bedford Harbor Environmental Monitoring
 Location: New Bedford, MA
 Client: USACE NAE

Project #: G606422
 Vessel: CF
 Chief Scientist: _____

Station ID: 620
 Core Sample ID: S-07A-0620-00-32
 Logged by: AMV/mw
 Collection Mechanism: Push-Core
 Date: 6/6/07

Time On Station: 1508
 Northing (NAD 83): 2707289.50
 Easting (NAD 83): 815686.83
 GPS Accuracy: 3.41
 Predicted Tide (ft): 1st core
 Time of Collection: 1511 1529
 Time Depart Station: 15.31

All measurements are ± 0.1 feet
 Water Depth (A): 20' 28" 2.6'
 Length of push core assembly (B): 20' 8" 8.2'
 Water surface to top of handle (C): 41' 2" 2.0'
 Length of core (from bottom) (D): 3.2'
 Surveyed elevation (NVGD 29) (E): 7'
 Water surface from surveyed elevation (F): 27' 0.5' ①

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>0.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-5.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-4.4</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.5</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-2.1</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.2		OL Silt	Black	loose	fine			
1.3		Clay	olive gray	stiff	fine			
0.0								

File ID of digital photograph(s): _____
 Comments:
1st sample N/G
2nd sample N/G
 ① Tide board correction

[illegible]

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel:	
		Client: USACE NAE				Chief Scientist:	

Station ID: <u>AAA39</u>	Time On Station: <u>12:02</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07A-AAA39-09-12</u>	Northing (NAD 83): <u>2704465.6</u>	Water Depth (A): <u>3.0</u>	
Logged by: <u>TH</u>	Easting (NAD 83): <u>TH 815640.6</u>	Length of push core assembly (B): <u>7.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.29</u>	Water surface to top of handle (C): <u>2.6</u>	
Date: <u>6/8/07</u>	Predicted Tide (ft): <u>-</u>	Length of core (from bottom) (D): <u>1.2</u>	
	Time of Collection: <u>12:12</u>	Surveyed elevation (NVGD 29) (E): <u>-</u>	
	Time Depart Station: <u>12:15</u>	Water surface from surveyed elevation (F): <u>1.3'</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	1.3
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-3.1
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-2.7
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-1.9
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-1.7
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2'		bl- silt/	dark	loose	fine-			entire core appears to be to silty sand color notably lighter from 0.0 to 0.4 <div style="text-align: right; margin-top: 20px;"> TH N = 2704465.6 E = 815638.4 </div>
0.4'		organic	brown		med			
0		clay/ sand	light brown	silt	fine			
					f-mo			
					sand			

File ID of digital photograph(s):

Comments:

Pic # 0711

[illegible]

Calculations for Determination of Z* Elevation	
(G) Elevation of Water Surface (NVGD): $E - F$	2.5
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-2.3
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-2.2
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-1.3
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-1.1
(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)	

[illegible]

Comments:

PIC # 0715

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Station ID: C5 Time On Station: 1513 All measurements are ± 0.1 feet
 Core Sample ID: S-07A-0C05-60-13 Northing (NAD 83): 2707673.6 Water Depth (A): 5.8'
 Logged by: mw/TA Easting (NAD 83): 815601.4 Length of push core assembly (B): 9'
 Collection Mechanism: Push-Core GPS Accuracy: 2.48 Water surface to top of handle (C): 2.0
 Date: 6/8/07 Predicted Tide (ft): — Length of core (from bottom) (D): 4.5' SLT 1.3 TH
 Time of Collection: 1514 Surveyed elevation (NVGD 29) (E): —
 Time Depart Station: 1516 Water surface from surveyed elevation (F): 2.9

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$ 2.9
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -4.1
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -3.4
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -2.8
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -2.9
 (Note if I \neq I₂ within ± 1.0 feet, discard and resample) —

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.3 0.7' 0.0	—	silt sand/ clay w/ peat?	black light brown	loose firm	fine f-m sand	—	—	—

File ID of digital photograph(s):

Comments:

PIC-4730

Station ID: <u>2223</u>	Time On Station: <u>1534</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07A-2223-00-12</u>	Northing (NAD 83): <u>270482.2</u>	Water Depth (A): <u>5.8'</u>
Logged by: <u>mw/jh</u>	Easting (NAD 83): <u>815613.4</u>	Length of push core assembly (B): <u>9'</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.38</u>	Water surface to top of handle (C): <u>2.0'</u>
Date: <u>6/8/2007</u>	Predicted Tide (ft): <u>-</u>	Length of core (from bottom) (D): <u>14.5' slt 1.2</u>
	Time of Collection: <u>1536</u>	Surveyed elevation (NVGD 29) (E): <u>-</u>
	Time Depart Station: <u>1539</u>	Water surface from surveyed elevation (F): <u>2.5</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ 2.5

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -4.5

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -4.0

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -3.3

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -3.3

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2 0.5' 0.0		silt clay	black olive gray	loose firm	fine fine			

File ID of digital photograph(s):

Comments:

PIC = 0733

[illegible]

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel:		Chief Scientist:	
		Client: <u>USACE NAE</u>					

Station ID: <u>9A22</u>	Time On Station: <u>1126</u>	All measurements are ± 0.1 feet	
Core Sample ID: _____	Northing (NAD 83): <u>2704867.71</u>	Water Depth (A): <u>2.5 2.3</u>	
Logged by: <u>mw</u>	Easting (NAD 83): <u>815000.4</u>	Length of push core assembly (B): <u>5.7 8.1</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.68</u>	Water surface to top of handle (C): <u>2.0 2.3</u>	
Date: <u>6/11/2007</u>	Predicted Tide (ft): _____	Length of core (from bottom) (D): _____	
	Time of Collection: <u>1433</u>	Surveyed elevation (NVGD 29) (E): _____	
	Time Depart Station: _____	Water surface from surveyed elevation (F): <u>2.6</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ _____

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ _____

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ _____

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ _____

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ _____

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<div style="transform: rotate(-45deg); font-size: 2em; opacity: 0.5;"> needs to be resampled </div>								

File ID of digital photograph(s): _____

Comments: 1st Attempt NG (sheen)
1140 - need longer core Tube and need higher tide / did not collect core. mw 6/11/07

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring			Project #: G606422	
Location: New Bedford, MA		Vessel:			Chief Scientist:	
Client: USACE NAE						

Station ID:	<u>DD40</u>	Time On Station:	<u>0939</u>	All measurements are ± 0.1 feet	
Core Sample ID:		Northing (NAD 83):	<u>2704451.9</u>	Water Depth (A):	<u>3.63836</u>
Logged by:	<u>MW</u>	Easting (NAD 83):	<u>815075.9</u>	Length of push core assembly (B):	<u>8.20</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.46</u>	Water surface to top of handle (C):	<u>5.648</u>
Date:	<u>6/11/2007</u>	Predicted Tide (ft):		Length of core (from bottom) (D):	<u>3.8'</u>
		Time of Collection:	<u>0943.00</u>	Surveyed elevation (NVGD 29) (E):	<u>-</u>
		Time Depart Station:	<u>1015</u>	Water surface from surveyed elevation (F):	<u>-1.0</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<div style="transform: rotate(-45deg); font-size: 2em; opacity: 0.5;"> recovery not acceptable - will re collect 6/12/07 PMH </div>								

File ID of digital photograph(s):

Comments:

1st Attempt NG (short)

2nd Attempt NG (strong H₂S odor) heavy stream

3rd Attempt NG overpunctured (stream + odor)

[illegible]

[illegible]

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE			Project #: G606422 Vessel: Chief Scientist:				
Station ID:	UU35	Time On Station:	0922	All measurements are ±0.1 feet					
Core Sample ID:	S-07A-UU35-08-16	Northing (NAD 83):	2704562.9	Water Depth (A):	3.5				
Logged by:	MW / TH	Easting (NAD 83):	815487.5	Length of push core assembly (B):	6.2				
Collection Mechanism:	Push-Core	GPS Accuracy:	2.23	Water surface to top of handle (C):	1.0				
Date:	6/12/2007	Predicted Tide (ft):	-	Length of core (from bottom) (D):	1.6				
		Time of Collection:	0925	Surveyed elevation (NVGD 29) (E):	-				
		Time Depart Station:	0930	Water surface from surveyed elevation (F):	-0.3				
Calculations for Determination of Z* Elevation									
(G)	Elevation of Water Surface (NVGD): E - F			-0.3					
(H)	Elevation of the bottom of the core (NVGD): G - (B - C)			-5.5					
(Z*)	Elevation of visual transition (NVGD): H + (distance to visual transition)			-4.9					
(I)	Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D			-3.9					
(I ₂)	Elevation of the sediment-water interface as measured from water depth (NVGD): G - A			-3.8					
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)									
	Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.6 0.6' 0.0'		silt clay	black olive gray	loose mod firm	fine fine			
File ID of digital photograph(s):									
Comments: PIC= 0739									

[illegible]

Station ID:	<u>SS 23</u>	Time On Station:	<u>1004</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07A-SS23-00-10</u>	Northing (NAD 83):	<u>2704875.9</u>	Water Depth (A):	<u>3.0</u>
Logged by:	<u>mw/jh</u>	Easting (NAD 83):	<u>815448.9</u>	Length of push core assembly (B):	<u>8.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.05</u>	Water surface to top of handle (C):	<u>3.9</u>
Date:	<u>6/12/2007</u>	Predicted Tide (ft):	<u>—</u>	Length of core (from bottom) (D):	<u>1.0</u>
		Time of Collection:	<u>1006</u>	Surveyed elevation (NVGD 29) (E):	<u>—</u>
		Time Depart Station:	<u>1010</u>	Water surface from surveyed elevation (F):	<u>-0.8</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ -0.8

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -4.9

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -4.6

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -3.9

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -3.8

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

	Elevation (NVGD) (i.e. Bottom = H)		Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.0 0.3' 0.0	- - -	-	cl silt clay	black mod firm olive gray	loose mod firm	fine fine	-	- - -	

File ID of digital photograph(s):

Comments:

710 = 0745

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel:			
		Client: <u>USACE NAE</u>		Chief Scientist:			

Station ID: <u>0030</u>	Time On Station: <u>1045</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07A-0030-00-1A</u>	Northing (NAD 83): <u>2704550.9</u>	Water Depth (A): <u>3.0</u>	
Logged by: <u>MW/TH 25TH</u>	Easting (NAD 83): <u>815350.3</u>	Length of push core assembly (B): <u>8.7</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.91</u>	Water surface to top of handle (C): <u>2+2.0</u>	1.9
Date: <u>6/12/2007</u>	Predicted Tide (ft): <u>—</u>	Length of core (from bottom) (D): <u>2.5</u>	
	Time of Collection: <u>1044-1050 1101</u>	Surveyed elevation (NVGD 29) (E): <u>—</u>	
	Time Depart Station: <u>1105</u>	Water surface from surveyed elevation (F): <u>-1.2</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	-1.2
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-7.0
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-5.6
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-4.5
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-4.2
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	—

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.5 1.4 0.0		silt clay	black olive gray	loose mod firm	fine fine			Transition may be as high as 1.6' from bottom - some streaking observed.

File ID of digital photograph(s):
 Comments:

1st Attempt NG not enough penetration recovery

2nd Attempt NG not enough recovery

PK = 0749

[illegible]

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE			Project #: G606422 Vessel: Chief Scientist:			
Station ID: MM25	Time On Station: 1115	All measurements are ± 0.1 feet						
Core Sample ID: S-07A-MM25-60-17	Northing (NAD 83): 2704812.1	Water Depth (A): 2.6						
Logged by: mw	Easting (NAD 83): 815311.2	Length of push core assembly (B): 807.0						
Collection Mechanism: Push-Core	GPS Accuracy: 2.68	Water surface to top of handle (C): 292.6						
Date: 6/12/2007	Predicted Tide (ft): -	Length of core (from bottom) (D): 16.56						
	Time of Collection: 1118, 1123, 1128	Surveyed elevation (NVGD 29) (E): -						
	Time Depart Station: 1131	Water surface from surveyed elevation (F): -1.3						
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): $E - F$		-1.3						
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$		-5.7						
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$		-5.0						
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$		-4.0						
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$		-3.9						
(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.7 0.7-0.8' 0.0	- - -	silt clay	black olive grey	loose mod firm	fine fine	- -	-	
File ID of digital photograph(s):								
Comments: 1 st Attempt NG - not enough recovery 2 nd Attempt NG - not enough recovery PIC = 0753								

[illegible]

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: 			
		Client: USACE NAE		Chief Scientist: 			

Station ID: <u>DD 40</u>	Time On Station: <u>1349</u>	All measurements are ±0.1 feet	
Core Sample ID: <u>S-07A-DD40-BB-SS</u>	Northing (NAD 83): <u>2704450.1</u>	Water Depth (A): <u>4.0</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815074.8</u>	Length of push core assembly (B): <u>10.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.17</u>	Water surface to top of handle (C): <u>.4</u>	
Date: <u>6/12/2007</u>	Predicted Tide (ft): <u>—</u>	Length of core (from bottom) (D): <u>5.4</u>	
	Time of Collection: <u>1400</u>	Surveyed elevation (NVGD 29) (E): <u>—</u>	
	Time Depart Station: <u>1407</u>	Water surface from surveyed elevation (F): <u>-1.3</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): E - F	<u>-0.3</u>
(H) Elevation of the bottom of the core (NVGD): G - (B - C)	<u>-9.9</u>
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)	<u>-9.5</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D	<u>-4.4</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A	<u>-4.3</u>
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<div style="text-align: center;">3.5</div> <div style="text-align: center;">1.4</div> <div style="text-align: center;">0.4</div>			silt + black clay	loose mod firm	fine fine			0.4 to 1.4 gradual trans. to native material 0.0 - 0.4 - clay. Distinct line @ 1.4', but still v. dark material.

File ID of digital photograph(s): PIC 0761 - 0765

Comments:

Photo ID - 101-~~02-68~~ 5/6-0768 TMM
Voa Sampler Taken By Jacobs

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: R/V Gale Force			
		Client: USACE NAE		Chief Scientist: Theresa Himmer/Alex Mansfield			

Station ID: <u>CC24</u>	Time On Station: <u>0932</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>07A-CC24-00-35</u>	Northing (NAD 83): <u>2704851.1</u>	Water Depth (A): <u>6.5/6.6</u>	
Logged by: <u>M. Walsh</u>	Easting (NAD 83): <u>815050.1</u>	Length of push core assembly (B): <u>13.0/13.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.04</u>	Water surface to top of handle (C): <u>1.2/2.5</u>	
Date: <u>7/31/07</u>	Predicted Tide (ft): <u> </u>	Length of core (from bottom) (D): <u>3.5</u>	
	Time of Collection: <u>0935/0945</u>	Surveyed elevation (NVGD 29) (E): <u> </u>	
	Time Depart Station: <u>0948</u>	Water surface from surveyed elevation (F): <u>3.0</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	3.0
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-7.5
(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-5.9
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-4.0'
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-3.6

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.5		silt	black	loose	fine	slight H ₂ S odor		
1.6		sandy clay	light gray	fine stiff	fine	S		
0.0								

File ID of digital photograph(s):
 Comments:

1st Attempt not enough penetration
 VOA samples taken by Jacobs
 photo ID 101-0770

Page _____ of _____

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: R/V Gale Force		Chief Scientist: Theresa Himmer/Alex Mansfield	
Client: USACE NAE							

Station ID: <u>DD34</u>	Time On Station: <u>1052</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-074-DD34-00-41</u>	Northing (NAD 83): <u>2704599.9</u>	Water Depth (A): <u>6.6</u>	
Logged by: <u>M. Walsh</u>	Easting (NAD 83): <u>815073.4</u>	Length of push core assembly (B): <u>12.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.00</u>	Water surface to top of handle (C): <u>45.0</u> TMH	
Date: <u>7/31/07</u>	Predicted Tide (ft): <u>—</u>	Length of core (from bottom) (D): <u>4.1</u>	
	Time of Collection: <u>1101</u>	Surveyed elevation (NVGD 29) (E): <u>—</u>	
	Time Depart Station: <u>1109</u>	Water surface from surveyed elevation (F): <u>2.1</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	2.1
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-9.2
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-7.6
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-5.1
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-4.5

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
4.1		silt	Black	loose	fine			
1.6		clay	olive gray	stiff	fine			
0.0								

File ID of digital photograph(s):
 Comments:

VOA sampler Taken by Jacobs

 PHOTO ID 101-0774 = use 101-0773 - better photo TMH 7/31/07

Page _____ of _____

Water surface from surveyed elevation (F): 1.4

- 33

Page _____ of _____

[illegible]

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Progress-dredge Sediments

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Station ID: <u>DD 22</u>	Time On Station: <u>0855</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07B-DD22-DD-24</u>	Northing (NAD 83): <u>2704897.04</u>	Water Depth (A): <u>6'</u>
Logged by: <u>M. Walsh</u>	Easting (NAD 83): <u>815075.56</u>	Length of push core assembly (B): <u>11.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.16</u>	Water surface to top of handle (C): <u>2.3</u>
Date: <u>8/23/07</u>	Predicted Tide (ft): <u>—</u>	Length of core (from bottom) (D): <u>2.4</u>
	Time of Collection: <u>0901</u>	Surveyed elevation (NVGD 29) (E): <u>—</u>
	Time Depart Station: <u>0905</u>	Water surface from surveyed elevation (F): <u>-0.3</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

-0.3
 $-8.4 - 9.0 = -7.4$
 $-7.4 - 8.0 = -15.4$
 $-15.4 - 6.4 = -21.8$
 -6.6

Elevation (NVGD) (i.e. Bottom = 0)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.4		Silt	Blk	loose	fine			
0.0		Clay	gray	stiff	fine			

File ID of digital photograph(s):

Comments:

Strong H₂S odor

① L.S. Incorrect information entered into sheet, 3/7/08

Water surface from surveyed elevation (F): -0.7

Page ____ of ____

Station ID:	<u>FF26</u>	Time On Station:	<u>0934</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-FF26-00-17</u>	Northing (NAD 83):	<u>2704798.26</u>	Water Depth (A):	<u>5.0</u>
Logged by:	<u>M. Walsh</u>	Easting (NAD 83):	<u>815125.86</u>	Length of push core assembly (B):	<u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.03</u>	Water surface to top of handle (C):	<u>4.1</u>
Date:	<u>8/23/07</u>	Predicted Tide (ft):	<u>—</u>	Length of core (from bottom) (D):	<u>1.7</u>
		Time of Collection:	<u>0937</u>	Surveyed elevation (NVGD 29) (E):	<u>—</u>
		Time Depart Station:	<u>0941</u>	Water surface from surveyed elevation (F):	<u>-1.6</u>

Calculations for Determination of Z* Elevation

- | | |
|--|-------------|
| (G) Elevation of Water Surface (NVGD): $E - F$ | <u>-0.6</u> |
| (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ | <u>-7.5</u> |
| (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ | <u>-6.4</u> |
| (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ | <u>-5.8</u> |
| (I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ | <u>-5.6</u> |
- (Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments: ~~Four~~ heavy sheen when dumping core

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422					
		Location: New Bedford, MA		Vessel: R/V Gale Force					
		Client: USACE NAE		Chief Scientist: Theresa Himmer/Alex Mansfield					
All measurements are ±0.1 feet									
Station ID:	<u>6625</u>	Time On Station:	<u>0944</u>						
Core Sample ID:	<u>5-07B-6625-00-18</u>	Northing (NAD 83):	<u>2704823.20</u>	Water Depth (A):	<u>5.0</u>				
Logged by:	<u>M. Walsh</u>	Easting (NAD 83):	<u>815149.39</u>	Length of push core assembly (B):	<u>11.0</u>				
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.66</u>	Water surface to top of handle (C):	<u>4.1</u>				
Date:	<u>8/23/07</u>	Predicted Tide (ft):	<u> </u>	Length of core (from bottom) (D):	<u>1.8</u>				
		Time of Collection:	<u>0947</u>	Surveyed elevation (NVGD 29) (E):	<u> </u>				
		Time Depart Station:	<u>0951</u>	Water surface from surveyed elevation (F):	<u>-0.4</u>				
Calculations for Determination of Z* Elevation									
(G) Elevation of Water Surface (NVGD): $E - F$				<u>-0.4</u>					
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$				<u>-7.3</u>					
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$				<u>-5.8</u>					
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$				<u>-5.5</u>					
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$				<u>-5.4</u>					
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)									
Core Log									
	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.8		silt	black	loose	fine			
	1.5								
			clay	olive	stiff	fine			
			shell	gray					
	0.0		hash						
File ID of digital photograph(s):									
Comments: <u>Heavy silt</u>									

[illegible]

Battelle The Business of Innovation		Project Name: <i>New Bedford Harbor Environmental Monitoring</i>			Project #: <i>G606422</i>				
		Location: <i>New Bedford, MA</i>			Vessel: <i>R/V Gale Force</i>				
		Client: <i>USACE NAE</i>			Chief Scientist: <i>Theresa Himmer/Alex Mansfield</i>				
Station ID: <i>FF28</i>		Time On Station: <i>1052</i>			All measurements are ± 0.1 feet				
Core Sample ID: <i>S-07B-FF28-00-18</i>		Northing (NAD 83): <i>2704736.7</i>			Water Depth (A): <i>4.5</i>				
Logged by: <i>M. Walsh</i>		Easting (NAD 83): <i>815110.2</i>			Length of push core assembly (B): <i>11.0</i>				
Collection Mechanism: <i>Push-Core</i>		GPS Accuracy: <i>2.63</i>			Water surface to top of handle (C): <i>4.7</i>				
Date: <i>8/23/07</i>		Predicted Tide (ft): <i>—</i>			Length of core (from bottom) (D): <i>1.8</i>				
		Time of Collection: <i>1057</i>			Surveyed elevation (NVGD 29) (E): <i>—</i>				
		Time Depart Station: <i>1100</i>			Water surface from surveyed elevation (F): <i>70.4</i>				
Calculations for Determination of Z* Elevation									
(G) Elevation of Water Surface (NVGD): $E - F$					<i>-0.4</i>				
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$					<i>-6.7</i>				
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$					<i>-5.3</i>				
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$					<i>-4.9</i>				
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$					<i>-4.9</i>				
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)									
	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	<i>1.8</i>		<i>silt/clay</i>	<i>dark gray</i>	<i>loose</i>	<i>fine</i>			
	<i>1.4</i>			<i>olive gray</i>	<i>stiff</i>	<i>fine</i>			
	<i>0.0</i>		<i>clay</i>						
File ID of digital photograph(s):									
Comments:									

[illegible]

Page ____ of ____

Battelle <i>The Business of Innovation</i>			Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE						Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer/Alex Mansfield		
Station ID:		6629		Time On Station:		1130		All measurements are ±0.1 feet			
Core Sample ID:		S-078-6629-00-28		Northing (NAD 83):		8709717.3		Water Depth (A):		4.3	
Logged by:		M. Walsh		Easting (NAD 83):		815149.4		Length of push core assembly (B):		11.0	
Collection Mechanism:		Push-Core		GPS Accuracy:		1.64		Water surface to top of handle (C):		4.1	
Date:		8/23/07		Predicted Tide (ft):				Length of core (from bottom) (D):		2.2	
				Time of Collection:		1132		Surveyed elevation (NVGD 29) (E):			
				Time Depart Station:		1138		Water surface from surveyed elevation (F):		-0.2	
Calculations for Determination of Z* Elevation											
(G)	Elevation of Water Surface (NVGD):	E - F								-0.2	
(H)	Elevation of the bottom of the core (NVGD):	G - (B - C)								-7.1	
(Z*)	Elevation of visual transition (NVGD):	H + (distance to visual transition)								-5.5	
(I)	Elevation of the sediment-water interface as measured from bottom of core (NVGD):	H + D								-4.9	
(I ₂)	Elevation of the sediment-water interface as measured from water depth (NVGD):	G - A								-4.5	
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)											
	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments		
	2.2		sand/shells	Black	loose	fine/mel					
	1.6		silt								
			clay	olive gray	firm	fine					
	0.0										
File ID of digital photograph(s):											
Comments:											

Calculations for Determination of Z* Elevation

(G)	Elevation of Water Surface (NVGD): $E - F$	-0.1
(H)	Elevation of the bottom of the core (NVGD): $G - (B - C)$	-9.2
(z')	Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-7.7
(I)	Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-6.8
(I ₂)	Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-6.6

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

[illegible]

[illegible]

[illegible]

[illegible]

Battelle

The Business of Innovation

Project Name: **New Bedford Harbor Environmental Monitoring**Location: **New Bedford, MA**Client: **USACE NAE**Project #: **G606422**Vessel: **R/V Gale Force**Chief Scientist: **Theresa Himmer**

Station ID:	<u>H2</u>	Time On Station:	<u>0915</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-078-0402-00-11</u>	Northing (NAD 83):	<u>2707747.41</u>	Water Depth (A):	<u>5.4</u>
Logged by:	<u>M. Walsh</u>	Easting (NAD 83):	<u>815724.38</u>	Length of push core assembly (B):	<u>10.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.69</u>	Water surface to top of handle (C):	<u>3.5</u>
Date:	<u>8/30/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>1.0</u>
		Time of Collection:	<u>0919</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>0921</u>	Water surface from surveyed elevation (F):	<u>3.5</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.0		silt	Black	loose	fine			
0.0		Clay	olive gray	firm	fine			

File ID of digital photograph(s):

Comments:

[illegible]

Station ID: <u>I4</u>	Time On Station: <u>0944</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07B-0104-00-16</u>	Northing (NAD 83): <u>2708710.87</u>	Water Depth (A): <u>5.8</u>
Logged by: <u>M. Walsh</u>	Easting (NAD 83): <u>815761.20</u>	Length of push core assembly (B): <u>10.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.45</u>	Water surface to top of handle (C): <u>2.4</u>
Date: <u>8/30/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.6</u>
	Time of Collection: <u>0947</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>0953</u>	Water surface from surveyed elevation (F): <u>+3.7</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>3.7</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-3.9</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-2.6</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.3</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-2.1</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.6		Silt	Dark	loose	fine			
1.3		clay mix	gray	loose	fine			
		Play	ol. in	firm	fine			
		sand	gray		med			
0.0		shells						

File ID of digital photograph(s):

Comments:

Station ID:	<u>I7</u>	Time On Station:	<u>0958</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-0107-00-11</u>	Northing (NAD 83):	<u>27007636.0</u>	Water Depth (A):	<u>5.6</u>
Logged by:	<u>M. Walsh</u>	Easting (NAD 83):	<u>815750.08</u>	Length of push core assembly (B):	<u>10.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>3.34</u>	Water surface to top of handle (C):	<u>3.1</u>
Date:	<u>8/30/67</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>1.1</u>
		Time of Collection:	<u>1600</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1004</u>	Water surface from surveyed elevation (F):	<u>+3.7</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.1		silt sand	Black	100% silt	fine med			
	.9		Clay Sand	olive gray	100% silt	fine to med			
	0.0								

File ID of digital photograph(s):

Comments:

① wo d.d. 9/4/07

Station ID: <u>J8</u>	Time On Station: <u>1028</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>5-078-008-00-17</u>	Northing (NAD 83): <u>2707600.4</u>	Water Depth (A): <u>5.2</u>
Logged by: <u>M. W. 154</u>	Easting (NAD 83): <u>815775.38</u>	Length of push core assembly (B): <u>10.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.6</u>	Water surface to top of handle (C): <u>2.7</u>
Date: <u>8/30/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.7</u>
	Time of Collection: <u>1032</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1034</u>	Water surface from surveyed elevation (F): <u>3.5</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>3.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-3.8</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-2.3</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.1</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-1.7</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.7		silt	gray	100X	fine to med			
1.5		sand	black	100X	med to fine			
		clay	olive	firm				
0.0		sand	gray					

File ID of digital photograph(s):

Comments:

Station ID:	<u>4634</u>	Time On Station:	<u>1105</u>	All measurements are ± 0.1 feet
Core Sample ID:	<u>S-07B-1134-00-16</u>	Northing (NAD 83):	<u>2704598.5</u>	Water Depth (A):
Logged by:	<u>M. Walsh</u>	Easting (NAD 83):	<u>815274.7</u>	Length of push core assembly (B):
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>1.75</u>	Water surface to top of handle (C):
Date:	<u>8/30/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):
		Time of Collection:	<u>1120</u>	Surveyed elevation (NVGD 29) (E):
		Time Depart Station:	<u>1133</u>	Water surface from surveyed elevation (F):

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

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File ID of digital photograph(s):

Comments:

[illegible]

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GG35

1236

All measurements are ± 0.1 feet

S-07B-6635-00-18

2704564.9

52

SMF / MW

815 138.67

15.0

Push-Core

2.02

6.0

8130107


NA

1.8

1241

NA

1744

Water surface from surveyed elevation (F): 

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): *E - F*

1800

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

-6.8

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-6.1

(I_2) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

6.

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
		silt clay	Black → grey grey	loose mod. firm	fine fine			

File ID of digital photograph(s):

Comments:

Station ID:	<u>GG38</u>	Time On Station:	<u>1255</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-G63800-16</u>	Northing (NAD 83):	<u>2704498.33</u>	Water Depth (A):	<u>7.1</u>
Logged by:	<u>JMF</u>	Easting (NAD 83):	<u>815148.20</u>	Length of push core assembly (B):	<u>15.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.64</u>	Water surface to top of handle (C):	<u>6.2</u>
Date:	<u>8/30/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>1.6</u>
		Time of Collection:	<u>1259</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1303</u>	Water surface from surveyed elevation (F):	<u>+1.6</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): *E - F*

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I_2) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

[illegible]

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Page _____ of _____

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Page _____ of _____

[illegible]

5.0
~~2.2~~
-1.2

$$\begin{array}{r} -1.2 \\ -7.8 \\ -6.7 \\ -6.4 \\ -6.2 \end{array}$$

0

Comments:

[illegible]

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel: R/V Gale Force	
		Client: USACE NAE				Chief Scientist: Theresa Himmer	

Station ID:	<u>FF38</u>	Time On Station:	<u>0953</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-FF38-00-15</u>	Northing (NAD 83):	<u>2704498.24</u>	Water Depth (A):	<u>5.3</u>
Logged by:	<u>JH</u>	Easting (NAD 83):	<u>815125.62</u>	Length of push core assembly (B):	<u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.71</u>	Water surface to top of handle (C):	<u>4.0</u>
Date:	<u>9/6/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>1.5</u>
		Time of Collection:	<u>0956</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1004</u>	Water surface from surveyed elevation (F):	<u>-0.7</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.7</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-7.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.8</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-6.2</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-6.0</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<u>15.0</u> <u>0.9</u> <u>0.0</u> 		clay silty shellhash clay	dark gray black olive gray	floffy firm	fine- med. fine			well mixed

File ID of digital photograph(s):

Comments:

Station ID:

~~FF38~~ FF34
S-07B-FF34-00-22

Time On Station:

10-08

All measurements are ± 0.1 feet

Core Sample ID:

2 Northing (NAD 83):

Water Depth (A):

Logged by:

Easting (NAD 83):

Length of push core assembly (B):

Collection Mechanism:

GPS Accuracy:

Water surface to top of handle (C):

Date:

Predicted Tide (ft):

Length of core (from bottom) (D):

Time of Collection:

Surveyed elevation (NVGD 29) (*E*):

Time Depart Station:

Water surface from surveyed elevation (F): $= 0.8$

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

-0.8

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

-8.6

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

7.0

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-6.4

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

-6.2

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

Station ID: <u>EE41</u>	Time On Station: <u>1100</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07B-EE41-00-31</u>	Northing (NAD 83): <u>2704424.74</u>	Water Depth (A): <u>6.5</u>
Logged by: <u>MW/JH</u>	Easting (NAD 83): <u>815101.01</u>	Length of push core assembly (B): <u>12.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.13</u>	Water surface to top of handle (C): <u>2.1</u>
Date: <u>9/6/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>3.1</u>
	Time of Collection: <u>1102</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1111</u>	Water surface from surveyed elevation (F): <u>-0.5</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-10.4</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-9.4</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-7.3</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-7.0</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.1		Silt	Black	loose	fine			
2.2		clay	gray/grey					
1.6				loose				
1.0		clay	olive gray	firm	fine			
0.0								
								Blurred Transition

File ID of digital photograph(s):

Comments:

heavy sheen

1st attempt N/G
2nd attempt N/G

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Battelle
The Business of Innovation

Project #: G606422

Vessel: *R/V Gale Force*

Chief Scientist: Theresa Himmer

M12

1333

All measurements are ± 0.1 feet

S-07B-AM17-00-14

2707499.6

Water Depth (A):

4.0

154

815850.69

Length of push core assembly (B):

11.0

Push-Core

2.38

Water surface to top of handle (C):

5.5

9/16/07

NA

Length of core (from bottom) (D):

4/135

1335

Surveyed elevation (NVGD 29) (E):

NA

1342

Water surface from surveyed elevation (F):

0.6

(G) Elevation of Water Surface (NVGD): *E - F*

0.6

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

4

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

38

(f) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

- 25

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

-24-

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

File ID of digital photograph(s):

Comments:

[illegible]

Station ID:	<u>L03 L3</u>	Time On Station:	<u>1400</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-0103-00-15</u>	Northing (NAD 83):	<u>2707723.22</u>	Water Depth (A):	<u>3.23</u>
Logged by:	<u>DH</u>	Easting (NAD 83):	<u>815826.23</u>	Length of push core assembly (B):	<u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.19</u>	Water surface to top of handle (C):	<u>595.8</u>
Date:	<u>9/6/07</u>	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	<u>1.5</u>
		Time of Collection:	<u>1401 1406</u>	Surveyed elevation (NVGD 29) (E):	NA
		Time Depart Station:	<u>1415</u>	Water surface from surveyed elevation (F):	<u>0.9</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(J₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

1st attempt N/G

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[illegible]

[illegible]

[illegible]

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[illegible]

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[illegible]

Water surface from surveyed elevation (E): 2.6

5.

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[illegible]

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Calculations for Determination of Z* Elevation

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Comments:

[illegible]

[illegible]

[illegible]

Page of

Station ID:	<u>DD32</u>	Time On Station:	<u>1245</u>	All measurements are ± 0.1 feet
Core Sample ID:	<u>S-07B-DD32-CO-22</u>	Northing (NAD 83):	<u>2704647.86</u>	Water Depth (A): <u>9.5</u>
Logged by:	<u>JH</u>	Easting (NAD 83):	<u>815075.81</u>	Length of push core assembly (B): <u>15.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.42</u>	Water surface to top of handle (C): <u>2.9</u>
Date:	<u>9/13/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D): <u>2.2</u>
		Time of Collection:	<u>1254</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
		Time Depart Station:	<u>1258</u>	Water surface from surveyed elevation (F): <u>+0.2</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

Station ID: 0026 Time On Station: 0839 All measurements are ± 0.1 feet
 Core Sample ID: S-07B-0026-00-23 Northing (NAD 83): 2704776.58 Water Depth (A): 4.94.9
 Logged by: MW Easting (NAD 83): 815349.30 Length of push core assembly (B): 12011.0
 Collection Mechanism: Push-Core GPS Accuracy: 3.4 Water surface to top of handle (C): 4.047544
 Date: 9/20/07 Predicted Tide (ft): NA Length of core (from bottom) (D): 2.3
 Time of Collection: 0842/0946/1000 Surveyed elevation (NVGD 29) (E): NA
 Time Depart Station: 0916 Water surface from surveyed elevation (F): -0.4

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

-0.4

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

-7.9

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

-6.0

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-5.6

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-5.3

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.3 1.9		Silt	Black	loose	fine			
0.0		Clay	olive gray	Firm	fine			

File ID of digital photograph(s):

Comments:

1st Attempt N/G
 2nd Attempt N/G
 3rd Attempt N/G
 4th Attempt N/G

[illegible]

Station ID: <u>0032</u>	Time On Station: <u>1124</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07B-0032-00-26</u>	Northing (NAD 83): <u>2704646.6</u>	Water Depth (A): <u>5.2</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815849.7</u>	Length of push core assembly (B): <u>11.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.74</u>	Water surface to top of handle (C): <u>2.9</u>	
Date: <u>9/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.6</u>	
	Time of Collection: <u>1130</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1134</u>	Water surface from surveyed elevation (F): <u>+0.4</u>	

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

+0.4

-7.7

-6.3

-5.1

-4.8

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.6		Silt	Black	loose	fine			
1.4			gray black					
0.0		Clay	olive gray	firm	fine			

File ID of digital photograph(s):

Comments:

Water surface from surveyed elevation (F):

Page 1 of 1

Station ID:	M20	Time On Station:	1300	All measurements are ± 0.1 feet	
Core Sample ID:	S-07B-06m20-0024	Nothing (NAD 83):	2707297.53	Water Depth (A):	4.1
Logged by:	MRF	Easting (NAD 83):	815851.6	Length of push core assembly (B):	11
Collection Mechanism:	Push-Core	GPS Accuracy:	2.15	Water surface to top of handle (C):	4.2
Date:	9/20/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	2.4
		Time of Collection:	1305	Surveyed elevation (NVGD 29) (E):	NA
		Time Depart Station:	1314	Water surface from surveyed elevation (F):	1.0

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>		Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel: <u>R/V Gale Force</u>	
		Client: <u>USACE NAE</u>		Chief Scientist: <u>Theresa Himmer</u>	

Station ID: <u>K19</u>	Time On Station: <u>1334</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07B-0K19-00-24</u>	Northing (NAD 83): <u>7707323.78</u>	Water Depth (A): <u>4.54.6</u>	
Logged by: <u>MRF</u>	Easting (NAD 83): <u>815799.59</u>	Length of push core assembly (B): <u>11</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.08</u>	Water surface to top of handle (C): <u>4.33.8</u>	
Date: <u>9/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.4</u>	
	Time of Collection: <u>1340</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1344</u>	Water surface from surveyed elevation (F): <u>1.41.5</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>+1.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-5.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-3.9</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-3.3</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-3.1</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) <small>(i.e. Bottom = H)</small>	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.4		s. lf sand	Black	loose	fine-med			
1.8		Peat						
		clay	olive black	firm	fine			
0.0								

File ID of digital photograph(s):
 Comments: 1st attempt NG

Project #: G606422
Vessel: R/V Gale Force
Chief Scientist: Theresa Himmer

Station ID:	<u>518</u>	Time On Station:	<u>1401</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-0518-00-26</u>	Northing (NAD 83):	<u>2707347.9</u>	Water Depth (A):	<u>4.4</u>
Logged by:	<u>MRP</u>	Easting (NAD 83):	<u>815773.93</u>	Length of push core assembly (B):	<u>11</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>3.12</u>	Water surface to top of handle (C):	<u>3.7</u>
Date:	<u>9/20/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.6</u>
		Time of Collection:	<u>1407</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1403</u>	Water surface from surveyed elevation (F):	<u>1.6</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (J) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

+

-5.7

-3.6

-3-

-2.8

Elevation (NVGD) (i.e. Bottom = 0)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.6		silt +	Black	loose	fine-med			
2.1		peat						
		clay	olive grey	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Page 1 of 1

Station ID:	<u>514</u>	Time On Station:	<u>1447</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-078-0514-00-20</u>	Northing (NAD 83):	<u>2707448.03</u>	Water Depth (A):	<u>4.4</u>
Logged by:	<u>MRF</u>	Easting (NAD 83):	<u>815777.89</u>	Length of push core assembly (B):	<u>11</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>1.72</u>	Water surface to top of handle (C):	<u>4.4</u>
Date:	<u>9/20/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.0</u>
		Time of Collection:	<u>1451</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1458</u>	Water surface from surveyed elevation (F):	<u>1.7</u>

Calculations for Determination of Z^* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

+

-4.9

3.4

-2.9

2.7

[illegible]

File ID of digital photograph(s):

Comments:

Project #: G606422
Vessel: R/V Gale Force
Chief Scientist: Theresa Himmer

Station ID:	<u>NN24</u>	Time On Station:	<u>1550</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-NN24-00-25</u>	Northing (NAD 83):	<u>2704847.57</u>	Water Depth (A):	<u>6.5</u>
Logged by:	<u>MRF</u>	Easting (NAD 83):	<u>815324.87</u>	Length of push core assembly (B):	<u>11</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.16</u>	Water surface to top of handle (C):	<u>1.8</u>
Date:	<u>9/20/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.5</u>
		Time of Collection:	<u>1556</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1600</u>	Water surface from surveyed elevation (F):	<u>1.6</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.5 2.0		silt	Black	loose	fine			
		clay	olive grey	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

[illegible]

[illegible]

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422				
Location: New Bedford, MA		Vessel: R/V Gale Force						
Client: USACE NAE		Chief Scientist: Theresa Himmer						
<div>Station ID: Q6 Time On Station: 0942 All measurements are ±0.1 feet</div> <div>Core Sample ID: S-07B-QQ6-00-09 Northing (NAD 83): 2707649.50 Water Depth (A): 6.3</div> <div>Logged by: MW/JH Easting (NAD 83): 815946.94 Length of push core assembly (B): 11.0</div> <div>Collection Mechanism: Push-Core GPS Accuracy: 2.12 Water surface to top of handle (C): 3.5</div> <div>Date: 9/27/07 Predicted Tide (ft): NA Length of core (from bottom) (D): 0.9</div> <div>Time of Collection: 0946 Surveyed elevation (NVGD 29) (E): NA</div> <div>Time Depart Station: 0951 Water surface from surveyed elevation (F): +3.6</div>								
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): E - F				+3.6				
(H) Elevation of the bottom of the core (NVGD): G - (B - C)				-3.9				
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)				-3.3				
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D				-3.0				
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A				-2.7				
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
0.9		silt w/ organic matter	black	loose	fine			shleen when core emptied
0.6		clay shells	olive gray	firm	fine			
0.0								
File ID of digital photograph(s):								
Comments: Shleen when core taken								

Water surface from surveyed elevation (F): **+3.6**

2.8

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[illegible]

Battelle The Business of Innovation	Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE	Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer						
Station ID: 08	Time On Station: 1020	All measurements are ±0.1 feet						
Core Sample ID: S-07B-000810-12	Northing (NAD 83): 7707600.21	Water Depth (A): 5.8						
Logged by: MW/JH	Easting (NAD 83): 815899.33	Length of push core assembly (B): 11.0						
Collection Mechanism: Push-Core	GPS Accuracy: 2.16	Water surface to top of handle (C): 4.0						
Date: 9/27/07	Predicted Tide (ft): NA	Length of core (from bottom) (D): 1.2						
	Time of Collection: 1023	Surveyed elevation (NVGD 29) (E): NA						
	Time Depart Station: 1029	Water surface from surveyed elevation (F): +3.0						
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): E - F		+3.0						
(H) Elevation of the bottom of the core (NVGD): G - (B - C)		-4.0						
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)		-3.1						
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D		-2.8						
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A		-2.8						
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		silt	black	loose	fine			Some sheen when core emptied
0.9		clay shells + organic matter	olive gray	firm	fine			
0.0								
File ID of digital photograph(s):								
Comments:								

[illegible]

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE		Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer				
Station ID:	P12	Time On Station:	1043	All measurements are ±0.1 feet				
Core Sample ID:	S-07B-P12-00-11	Northing (NAD 83):	2707999.03	Water Depth (A):	5.04			
Logged by:	MW/JH	Easting (NAD 83):	815923.78	Length of push core assembly (B):	11.0			
Collection Mechanism:	Push-Core	GPS Accuracy:	2.09	Water surface to top of handle (C):	5.0			
Date:	9/27/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	1.1			
		Time of Collection:	1044	Surveyed elevation (NVGD 29) (E):	NA			
		Time Depart Station:	1052	Water surface from surveyed elevation (F):	-2.5			
Calculations for Determination of Z' Elevation								
(G) Elevation of Water Surface (NVGD): E - F	+2.5							
(H) Elevation of the bottom of the core (NVGD): G - (B - C)	-3.5							
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)	-2.6							
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D	-2.4							
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A	-2.4							
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.1 — 0.9 — 0.0 —	—	silt clay	black olive gray	loose firm	fine fine	—	—	some sheen when core emptied
File ID of digital photograph(s):								
Comments:								

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Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE		Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer				
Station ID:	0025	Time On Station:	1113	All measurements are ±0.1 feet				
Core Sample ID:	S-07B-0025-02-18	Northing (NAD 83):	2704825.23	Water Depth (A):	6.764			
Logged by:	nw/jh	Easting (NAD 83):	815399.51	Length of push core assembly (B):	15.0			
Collection Mechanism:	Push-Core	GPS Accuracy:	1.91	Water surface to top of handle (C):	6.7			
Date:	9/27/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	1.8			
		Time of Collection:	1115	Surveyed elevation (NVGD 29) (E):	NA			
		Time Depart Station:	1122	Water surface from surveyed elevation (F):	+1.7			
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): E - F	+1.7							
(H) Elevation of the bottom of the core (NVGD): G - (B - C)	-6.6							
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)	-5.3							
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D	-4.8							
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A	-4.7							
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.8		silt w/ sand	black	loose	Fine-med.			some sheen when core emptied
1.3		clay	olive gray	firm	Fine			
0.0								
File ID of digital photograph(s):								
Comments:								

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE		Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer				
Station ID:	QQ32	Time On Station:	1129	All measurements are ±0.1 feet				
Core Sample ID:	S-078-QQ32-0025	Northing (NAD 83):	2704648.75	Water Depth (A):	5.8			
Logged by:	MW/JH	Easting (NAD 83):	815398.77	Length of push core assembly (B):	11.0			
Collection Mechanism:	Push-Core	GPS Accuracy:	1.70	Water surface to top of handle (C):	2.4			
Date:	9/27/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	2.5			
		Time of Collection:	1205	Surveyed elevation (NVGD 29) (E):	NA			
		Time Depart Station:	1210	Water surface from surveyed elevation (F):	+0.5			
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): E - F	+0.5							
(H) Elevation of the bottom of the core (NVGD): G - (B - C)	-8.1							
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)	-6.0							
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D	-5.6							
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A	-5.3							
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.5 2.1 0.0		silt sand clay/mix clay	black gray olive gray	loose firm	fine fine			some sheen when core emptied
File ID of digital photograph(s):								
Comments: 1st Attempt N/G 2nd Attempt N/G 3rd Attempt N/G 4th Attempt N/G								

Station ID:	<u>2030</u>	Time On Station:	<u>1220</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-QQ30-00-22</u>	Northing (NAD 83):	<u>2704699.31</u>	Water Depth (A):	<u>5.154</u>
Logged by:	<u>MW/JH</u>	Easting (NAD 83):	<u>815400.55</u>	Length of push core assembly (B):	<u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>245</u>	Water surface to top of handle (C):	<u>243.4</u>
Date:	<u>9/27/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.2</u>
		Time of Collection:	<u>1225/1227</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1232</u>	Water surface from surveyed elevation (F):	<u>0.0</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): *E - F*

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z^*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

- 7.6

-6.0

-5.4

51

[illegible]

File ID of digital photograph(s):

Comments:

1st Attempt N/G

Station ID: <u>RR22</u>	Time On Station: <u>1239</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07B-RR22-00-25</u>	Northing (NAD 83): <u>2704898.59</u>	Water Depth (A): <u>4.3</u>
Logged by: <u>mw/SH</u>	Easting (NAD 83): <u>815425.84</u>	Length of push core assembly (B): <u>11.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.20</u>	Water surface to top of handle (C): <u>4.0</u>
Date: <u>9/27/05</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.5</u>
	Time of Collection: <u>1241</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1245</u>	Water surface from surveyed elevation (F): <u>-0.4</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

-0.4

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

-7.4

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

-5.4

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-4.9

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-4.7

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.5		silt clay mix	gray	loose	fine			Some sheen when core emptied
2.0		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Station ID:	RR27	Time On Station:	1252	All measurements are ± 0.1 feet	
Core Sample ID:	S-07B-RR27-0025	Northing (NAD 83):	2704774.81	Water Depth (A):	4.2
Logged by:	MW/JH	Easting (NAD 83):	815425.17	Length of push core assembly (B):	11.0
Collection Mechanism:	Push-Core	GPS Accuracy:	2.30	Water surface to top of handle (C):	4.1
Date:	9/27/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	2.5
		Time of Collection:	1253	Surveyed elevation (NVGD 29) (E):	NA
		Time Depart Station:	1258	Water surface from surveyed elevation (F):	-0.6

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.5		sandy	gray	loose	fine			
2.3		silt	black		med			
		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

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[illegible]

[illegible]

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Station ID:	<u>RR39</u>	Time On Station:	<u>0852</u>	All measurements are ± 0.1 feet
Core Sample ID:	<u>S-07B-RR39-00-22</u>	Northing (NAD 83):	<u>2704474.80</u>	Water Depth (A): <u>4.2</u>
Logged by:	<u>MW/JH</u>	Easting (NAD 83):	<u>815424.07</u>	Length of push core assembly (B): <u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>1.74</u>	Water surface to top of handle (C): <u>4.4</u>
Date:	<u>10/4/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D): <u>2.2</u>
		Time of Collection:	<u>0853</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
		Time Depart Station:	<u>0902</u>	Water surface from surveyed elevation (F): <u>-0.7</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

$$\begin{array}{r} -0.7 \\ -7.3 \\ -5.5 \\ -5.1 \\ -4.9 \end{array}$$
[illegible]

File ID of digital photograph(s):

Comments:

ents: Strong H_2S oder

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Station ID:	<u>TT36</u>	Time On Station:	<u>0923</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-TT36-09-21</u>	Northing (NAD 83):	<u>2704550.45</u>	Water Depth (A):	<u>4.1</u>
Logged by:	<u>mwj/jsh</u>	Easting (NAD 83):	<u>815476.31</u>	Length of push core assembly (B):	<u>11.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2-21</u>	Water surface to top of handle (C):	<u>4.7</u>
Date:	<u>10/4/02</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.1</u>
		Time of Collection:	<u>0923</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>0932</u>	Water surface from surveyed elevation (F):	<u>-0.5</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.1 — 1.6 — 1.5 — 0.0 —		Silt clay	black gray olive gray	loose firm	fne. fine			

File ID of digital photograph(s):

Comments:

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Calculations for Determination of Z* Elevation

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Comments:

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Station ID:	<u>WW24</u>	Time On Station:	<u>1130</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07B-WW24-04-21</u>	Northing (NAD 83):	<u>7704849.37</u>	Water Depth (A):	<u>4.4</u>
Logged by:	<u>MW/JH</u>	Easting (NAD 83):	<u>815549.65</u>	Length of push core assembly (B):	<u>10.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.53</u>	Water surface to top of handle (C):	<u>3.3</u>
Date:	<u>10/4/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>2.1</u>
		Time of Collection:	<u>1131</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1136</u>	Water surface from surveyed elevation (F):	<u>0.0</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

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Post-dredge Sediments

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Station ID: <u>N14</u>	Time On Station: <u>1259</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-DN14-00-16</u>	Northing (NAD 83): <u>2707446.356</u>	Water Depth (A): <u>3.9</u>	
Logged by: <u>MW/MM</u>	Easting (NAD 83): <u>85873.954</u>	Length of push core assembly (B): <u>9.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.47</u>	Water surface to top of handle (C): <u>3.2</u>	
Date: <u>11/5/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.6</u>	
	Time of Collection: <u>1300</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1312</u>	Water surface from surveyed elevation (F): <u>+0.4</u>	

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

<u>+0.4</u>
<u>-5.4</u>
<u>-4.3</u>
<u>-3.8</u>
<u>-3.5</u>

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.6		Silt	Black	loose	fine			S-07D-DN14-00-15 TOP 0.5' will be Sampled for PCB+TOC/6 on 12/11/07 DMF/MMW
1.1								
0.0		Clay (shells)	olive gray	firm	fine			

File ID of digital photograph(s):

Comments:

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422				
		Location: New Bedford, MA		Vessel: R/V Gale Force				
		Client: USACE NAE		Chief Scientist: Theresa Himmer				
Station ID: N10		Time On Station: 1319		All measurements are ±0.1 feet				
Core Sample ID: S-07D-PN10-08-12		Northing (NAD 83): 2707547.948		Water Depth (A): 3.52.9				
Logged by: MW		Easting (NAD 83): 815 875.614		Length of push core assembly (B): 8.0				
Collection Mechanism: Push-Core		GPS Accuracy: 2.28		Water surface to top of handle (C): 353.7				
Date: 11/5/07		Predicted Tide (ft): NA		Length of core (from bottom) (D): 1.2				
		Time of Collection: 1325 1332		Surveyed elevation (NVGD 29) (E): NA				
		Time Depart Station: 1340		Water surface from surveyed elevation (F): +0.6				
Calculations for Determination of Z* Elevation								
(G) Elevation of Water Surface (NVGD): E - F				+0.6				
(H) Elevation of the bottom of the core (NVGD): G - (B - C)				-3.7				
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)				-2.9				
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D				-2.5				
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A				-2.3				
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)								
Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2 0.8 0.0		silt clay	Black olive gray	loose firm	fine fine			
File ID of digital photograph(s):								
Comments: 1st Attempt N/A								

✓

[illegible]

Station ID: <u>01</u>	Time On Station: <u>0918</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-0001-00-15</u>	Northing (NAD 83): <u>2707775.17</u>	Water Depth (A): <u>3.0</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815899.20</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.90</u>	Water surface to top of handle (C): <u>3.3</u>
Date: <u>11/6/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>
	Time of Collection: <u>0921</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>0926</u>	Water surface from surveyed elevation (F): <u>+0.8</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

+0.8

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

-3.9

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

-3.0

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-2.4

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-2.2

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		Silt	Black	loose	fine			S-07D-0001-00-06
0.9		Clay	olive gray	firm	fine			PCB + TOC/GS samples
0.0								taken from ^{TOP} 0.6' on
								12/11/07
								JMF/MW
								Chemical Odor
								12/11/07 JMF/MW

File ID of digital photograph(s):

Comments:

slight sheen on top of core

Battelle <i>The Business of Innovation</i>		Project Name: New Bedford Harbor Environmental Monitoring			Project #: G606422				
Location: New Bedford, MA		Client: USACE NAE			Vessel: R/V Gale Force				
					Chief Scientist: Theresa Himmer				
Station ID: K2		Time On Station: 0928		All measurements are ±0.1 feet					
Core Sample ID: S-07D-00K2-00-14		Northing (NAD 83): 2707749.12		Water Depth (A): 2.3					
Logged by: MW		Easting (NAD 83): 815800.88		Length of push core assembly (B): 8.0					
Collection Mechanism: Push-Core		GPS Accuracy: 3.27		Water surface to top of handle (C): 4.1					
Date: 11/6/07		Predicted Tide (ft): NA		Length of core (from bottom) (D): 1.4					
		Time of Collection: 0930		Surveyed elevation (NVGD 29) (E): NA					
		Time Depart Station: 0936		Water surface from surveyed elevation (F): +0.7					
Calculations for Determination of Z* Elevation									
(G) Elevation of Water Surface (NVGD): E - F				+0.7					
(H) Elevation of the bottom of the core (NVGD): G - (B - C)				-3.2					
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)				-2.6					
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D				-1.8					
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A				-1.6					
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)									
	Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.4 0.6 0.0		Silt clay (shells)	Black olive gray	loose firm	fine fine			S-07D-00K2-00-08 TOP 0.8' PCB + GSP samples taken 12/11/07 JMR/g
File ID of digital photograph(s):									
Comments:									

Station ID: <u>N4</u>	Time On Station: <u>0953</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-00N4-00-12</u>	Northing (NAD 83): <u>2707703.45</u>	Water Depth (A): <u>3.5</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815874.30</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.08</u>	Water surface to top of handle (C): <u>3.2</u>	
Date: <u>11/6/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.2</u>	
	Time of Collection: <u>0956</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1000</u>	Water surface from surveyed elevation (F): <u>+0.6</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

+0.6

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

-4.2

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

-3.6

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

-3.0

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-2.9

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		Silt	Black	loose	fine			S-07D-00N4-00-06
0.6		clay	olive gray	firm	fine			PCB + TOC/GS samples taken on 12/11/07 from TOP 0.6'
0.0								JMF/MW slight sheen on surface of core 12/11/07 JMF/pn

File ID of digital photograph(s):

Comments:

slight sheen on top of core

[illegible]

Battelle

The Business of Innovation

Project Name: *New Bedford Harbor Environmental Monitoring*Location: *New Bedford, MA*Client: *USACE NAE*Project #: *G606422*Vessel: *R/V Gale Force*Chief Scientist: *Theresa Himmer*

Station ID: <i>J14</i>	Time On Station: <i>1024</i>	All measurements are ± 0.1 feet
Core Sample ID: <i>S-07D-0J14-00-15</i>	Northing (NAD 83): <i>7707447.32</i>	Water Depth (A): <i>2.7</i>
Logged by: <i>mw</i>	Easting (NAD 83): <i>815777.65</i>	Length of push core assembly (B): <i>8.0</i>
Collection Mechanism: <i>Push-Core</i>	GPS Accuracy: <i>2.23</i>	Water surface to top of handle (C): <i>3.6</i>
Date: <i>11/16/07</i>	Predicted Tide (ft): <i>NA</i>	Length of core (from bottom) (D): <i>1.5</i>
	Time of Collection: <i>1028</i>	Surveyed elevation (NVGD 29) (E): <i>NA</i>
	Time Depart Station: <i>1033</i>	Water surface from surveyed elevation (F): <i>0.0</i>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<i>0.0</i>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<i>-4.4</i>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<i>-3.5</i>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<i>-2.9</i>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<i>-2.7</i>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<i>1.5</i> <i>0.9</i> <i>0.0</i>		<i>silt</i> <i>clay (shells)</i>	<i>black</i> <i>olive gray</i>	<i>loose</i> <i>firm</i>	<i>fine</i> <i>fine</i>			<i>S-07D-0J14-00-06</i> <i>① TOP 0.6'</i> <i>Slight sheen on</i> <i>top of core 12/11/07</i> <i>JMF/mw</i>

File ID of digital photograph(s):

Comments:

Slight sheen on surface of core *① PCB + TOC/SS sample taken*
12/11/07 JMF/mw

Battelle

The Business of Innovation

Project Name: New Bedford Harbor Environmental Monitoring

Location: New Bedford, MA

Client: USACE NAE

Project #: G606422

Vessel: R/V Gale Force

Chief Scientist: Theresa Himmer

Station ID: 09

Core Sample ID: S-07D-0009-00-12

Logged by: MW

Collection Mechanism: Push-Core

Date: 11/6/07

Time On Station: 1040

Northing (NAD 83): 2707575.88

Easting (NAD 83): 815950.80

GPS Accuracy: 1.72

Predicted Tide (ft): NA

Time of Collection: 1042

Time Depart Station: 1046

All measurements are ±0.1 feet

Water Depth (A): 2.5

Length of push core assembly (B): 8.0

Water surface to top of handle (C): 4.2

Length of core (from bottom) (D): 1.2

Surveyed elevation (NVGD 29) (E): NA

Water surface from surveyed elevation (F): 0.0

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): E - F

(H) Elevation of the bottom of the core (NVGD): G - (B - C)

(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

(Note if I ≠ I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		Silt	Black	loose	fine			S-07D-0009-00-12
0.7		Clay	olive gray	firm	fine			
0.0								Samples taken from for PCB (Homologues) on 12/11/07 JMF slight sheen on surf 12/11/07 JMF/

Photograph ID of digital photograph(s):

Comments:

1.5

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422			
		Location: New Bedford, MA				Vessel: R/V Gale Force			
		Client: USACE NAE				Chief Scientist: Theresa Himmer			

Station ID: <u>K5</u>	Time On Station: <u>0757</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-00K5-00-15</u>	Northing (NAD 83): <u>2707673.94</u>	Water Depth (A): <u>4.1</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815799.88</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.26</u>	Water surface to top of handle (C): <u>2.1</u>	
Date: <u>11/8/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>	
	Time of Collection: <u>0801</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>0803</u>	Water surface from surveyed elevation (F): <u>+2.2</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>+2.2</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-3.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-2.8</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.2</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-1.9</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5								
0.9		Silt sand to clay	Black	loose	fine to med			S-07D-00K5-00-06
0.0		Silt sand to clay	gray black to olive gray	stiff	fine to med			TOP 0.6' taken for PCB + TOC/GS analysis on 12/11/07 JMF/ML
								seen on top of core 12/11/07 JMF/ML

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring Location: New Bedford, MA Client: USACE NAE			Project #: G606422 Vessel: R/V Gale Force Chief Scientist: Theresa Himmer				
Station ID:	<u>J10 D4P</u>	Time On Station:	<u>0822</u>	All measurements are ±0.1 feet					
Core Sample ID:	<u>S-PTD-QJ10-00-12-REP</u>	Northing (NAD 83):	<u>2707548.85</u>	Water Depth (A):	<u>3.6</u>				
Logged by:	<u>MW</u>	Easting (NAD 83):	<u>815774.26</u>	Length of push core assembly (B):	<u>7.7</u>				
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.34</u>	Water surface to top of handle (C):	<u>2.8</u>				
Date:	<u>11/8/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>12</u>				
		Time of Collection:	<u>0843</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>				
		Time Depart Station:	<u>0854</u>	Water surface from surveyed elevation (F):	<u>+1.6</u>				
Calculations for Determination of Z* Elevation									
(G) Elevation of Water Surface (NVGD): E - F				<u>+1.6</u>					
(H) Elevation of the bottom of the core (NVGD): G - (B - C)				<u>-3.3</u>					
(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)				<u>-2.8</u>					
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D				<u>-2.1</u>					
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A				<u>-2.0</u>					
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)									
	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.2		silt	black	loose	fine			S-PTD-QJ10-00-12-REP ① TOP 0.7' slight sheen on surface 12/11/07 JMF/MW
	0.5		clay	olive gray	firm	fine			
	0.0								
File ID of digital photograph(s):									
Comments: ① PCB + GS/TAC Samples taken on 12/11/07 JMF/MW									

1.5

Battelle <i>The Business of Innovation</i>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel: R/V Gale Force	
		Client: USACE NAE				Chief Scientist: Theresa Himmer	

Station ID: <u>M17</u>	Time On Station: <u>0908</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-070-0M17-00-15</u>	Northing (NAD 83): <u>2707372.71</u>	Water Depth (A): <u>4.2</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815851.07</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.9</u>	Water surface to top of handle (C): <u>2.0</u>	
Date: <u>11/8/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>	
	Time of Collection: <u>0912</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>0915</u>	Water surface from surveyed elevation (F): <u>+1.2</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>+1.2</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-4.8</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-3.9</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-3.3</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-3.0</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		silts	gray	loose	fine			<p>S-070-0M17-00-06</p> <p>TOP 0.6' completed on 12/11/07 for TOC/GS + PCB + Homologous JMP/mw</p> <p>slight sheen on surface 12/11/07 JMP/mw</p>
1.3		silt	black	loose	fine			
0.9		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel: R/V Gale Force	
		Client: USACE NAE				Chief Scientist: Theresa Himmer	

Station ID: <u>J18</u>	Time On Station: <u>0920</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-070-J18-06-14</u>	Northing (NAD 83): <u>2707348.03</u>	Water Depth (A): <u>3.4</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815773.46</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>4.68</u>	Water surface to top of handle (C): <u>2.4</u>	
Date: <u>11/8/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>	
	Time of Collection: <u>0923</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>0927</u>	Water surface from surveyed elevation (F): <u>+0.9</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>+0.9</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-4.2</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-3.1</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.8</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-2.5</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		organic silt	gray	100%e	fine			some sand
1.1		silt/clay	gray	firm	fine			very mottled silt/clay mix over clay
0.0		clay mix	black					

File ID of digital photograph(s):

Comments:

2.8

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel: R/V Gale Force	
		Client: USACE NAE				Chief Scientist: Theresa Himmer	

Station ID: <u>K21</u>	Time On Station: <u>0931</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-0K21-00-28</u>	Northing (NAD 83): <u>770 7272.16</u>	Water Depth (A): <u>3.9</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815 801.50</u>	Length of push core assembly (B): <u>10.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.83</u>	Water surface to top of handle (C): <u>3.0</u>	
Date: <u>11/8/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.8</u>	
	Time of Collection: <u>1014</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1018</u>	Water surface from surveyed elevation (F): <u>-0.1</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.1</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-7.1</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-5.5</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-4.3</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-4.0</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.8		organic silt	Black gray	loose	fine			S-07D-0K21-00-28 mottled mix of silt and clay TOP 1.2' taken on 12/11/07 for PCB, TOC/6 + QA Splits 12/11/07 JMF/MW slight sheen on top 12/11/07 JMF/MW
2.1		silt	Black gray	loose	fine			
1.6		clay	gray	firm	fine			
0.0		clay	olive gray	firm	fine			

File ID of digital photograph(s):

Comments:
 First 4 Attempts N/G

1.5

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: R/V Gale Force			
		Client: USACE NAE		Chief Scientist: Theresa Himmer			

Station ID: <u>M 20</u>	Time On Station: <u>1025</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-070-01M20-08-15</u>	Northing (NAD 83): <u>2707247.70</u>	Water Depth (A): <u>292.3</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815851.82</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>1.75</u>	Water surface to top of handle (C): <u>4.0</u>	
Date: <u>11/8/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>	
	Time of Collection: <u>1035</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1039</u>	Water surface from surveyed elevation (F): <u>-0.4</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.4</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-4.4</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-3.2</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.9</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-2.7</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		silt	Black	loose	fine			Streaks down to 0.7
1.2		Clay	Olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:
1st Attempt N/6

Station ID: <u>WW41</u>	Time On Station: <u>1052</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-WW41-08-1.3</u>	Northing (NAD 83): <u>2704423.7</u>	Water Depth (A): <u>6.0</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815549.7</u>	Length of push core assembly (B): <u>9.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.34</u>	Water surface to top of handle (C): <u>1.4</u>
Date: <u>11/14/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.3</u>
	Time of Collection: <u>1056</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1160</u>	Water surface from surveyed elevation (F): <u>2.5</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

<u>2.5</u>
<u>-5.1</u>
<u>-4.4</u>
<u>-3.8</u>
<u>-3.5</u>

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.3		Silt Clay mix	Black and gray	loose and firm	fine			Mix layer w/2 of silt and clay
0.7		Clay	olive gray	firm	fine			S-07D-WW41-08-06
6.0								TOP 0.6' sampled for TCB + TOC/GS on 12/12/07 JMF/MW

File ID of digital photograph(s):

Comments:

Station ID: <u>XX 37</u>	Time On Station: <u>1108</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-070-XX37-00-14</u>	Northing (NAD 83): <u>2704524.4</u>	Water Depth (A): <u>6.4</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815575.2</u>	Length of push core assembly (B): <u>9.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.14</u>	Water surface to top of handle (C): <u>6.1</u>
Date: <u>11/14/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>
	Time of Collection: <u>1111</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1112</u>	Water surface from surveyed elevation (F): <u>2.4</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ 2.4

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -5.5

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -5.1

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -4.1

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -4.0

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt	Black	Loose	fine			
1.0		Silt	Gray	Firm	fine			
0.4		Clay	Black	Firm	fine			
0.0		Clay	olive gray	Firm	fine			
mixed layer of silt and clay								

File ID of digital photograph(s):

Comments:

1st Attempt 11/16 1108 MW

[illegible]

Station ID: <u>WW 24</u>	Time On Station: <u>1205</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-WW24-08-15</u>	Northing (NAD 83): <u>2704848.8</u>	Water Depth (A): <u>6.4</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815549.6</u>	Length of push core assembly (B): <u>9.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.50</u>	Water surface to top of handle (C): <u>0.9</u>
Date: <u>11/14/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>
	Time of Collection: <u>1209 1221</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1224</u>	Water surface from surveyed elevation (F): <u>1.6</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$ 1.6
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -6.5
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -5.8
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -5.0
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -4.8
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		Silt	Black	loose	Fine			S-07D-WW24-08-08
0.7		clay	olive gray	firm	Fine			same streaking
0.0								TOP 0.8' sampled for PCB + TOC/SS analysis on 12/12/07 JMF/AMW

File ID of digital photograph(s):

Comments:

1st Attempt N/G

Station ID: <u>BBB34</u>	Time On Station: <u>0850</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>SP7D-BBB34-00-11</u>	Northing (NAD 83): <u>2704602.15</u>	Water Depth (A): <u>2.5</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815676.62</u>	Length of push core assembly (B): <u>6.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.4</u>	Water surface to top of handle (C): <u>2.2</u>
Date: <u>11/16/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.1</u>
	Time of Collection: <u>0858</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>0900</u>	Water surface from surveyed elevation (F): <u>+0.4</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

0.4

-3.4

-3.4

-2.6 - 2.3

-2.1

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<u>1.1</u> <u>0.0</u>		<u>Sand with silt thought</u>	<u>gray Brown</u>	<u>loose</u>	<u>fine to med</u>			<u>no noticable Transition</u>

File ID of digital photograph(s):

Comments:

- Approx of lost on bottom (loose sand fell out)

① no d. 2. 11/30/07

6 - 2.5 = 3.5

-1.2

2.3

Station ID: <u>BBB23</u>	Time On Station: <u>0908</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-BBB23-00-13</u>	Northing (NAD 83): <u>2704874.17</u>	Water Depth (A): <u>2.8</u> 2.8 <u>3.1</u>
Logged by: <u>MW/JF</u>	Easting (NAD 83): <u>815675.45</u>	Length of push core assembly (B): <u>6.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.22</u>	Water surface to top of handle (C): <u>1.7</u> 1.7 <u>1.1</u>
Date: <u>11/16/07</u>	Predicted Tide (ft): <u>0.12 NA</u>	Length of core (from bottom) (D): <u>1.3</u>
	Time of Collection: <u>0912 0933</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>0930</u>	Water surface from surveyed elevation (F): <u>+0.6</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>0.6</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-3.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-3.3</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-2.5</u> -2.5 <u>-2.4</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-2.2</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.3		Sand	light brown	loose	fine to med			S-07D-BBB23-00-09
0.4		fine to med	Brown					
0.0		fine sand	Brown	loose to firm	fine			Samples taken for DP 0.9' for PCB + TOC/GS analysis on 12/11/07 JMF/MW

File ID of digital photograph(s):

Comments:

1st Attempt N/A
2nd Attempt - water surface
3rd attempt -

DDO L.B. 11/30/07

Station ID:	<u>5529</u>	Time On Station:	<u>0959</u>	All measurements are ± 0.1 feet
Core Sample ID:	<u>5-070-5529-00-15</u>	Northing (NAD 83):	<u>3704724.5</u>	Water Depth (A): <u>5.8</u>
Logged by:	<u>MW</u>	Easting (NAD 83):	<u>815450.8</u>	Length of push core assembly (B): <u>9.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>1.72</u>	Water surface to top of handle (C): <u>1.5</u>
Date:	<u>11/16/07</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>
		Time of Collection:	<u>1003</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
		Time Depart Station:	<u>1009</u>	Water surface from surveyed elevation (F): <u>10.6</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.5		silt	Black	loose	fine			
	1.1		silt clay	gray black	firm	fine			mixed silt clay layer
	0.8								S-07D-SS29-00-07
	0.0		clay	oliv gray	firm	fine			Sampled TOP 0.7' for PLB+TOC/GS analysis on 12/12/07 JMF/AMW

File ID of digital photograph(s):

Comments:

Page 1 of 1

Project #: G606422
Vessel: R/V Gale Force
Chief Scientist: M. Walsh

Station ID:	<u>TT39</u>	Time On Station:	<u>1034</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07D-TT39-00-14</u>	Northing (NAD 83):	<u>2704474.44</u>	Water Depth (A):	<u>0.8</u>
Logged by:	<u>MAW</u>	Easting (NAD 83):	<u>815476.00</u>	Length of push core assembly (B):	<u>7.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.36</u>	Water surface to top of handle (C):	<u>0.7</u>
Date:	<u>11/16/67</u>	Predicted Tide (ft):	<u>NA</u>	Length of core (from bottom) (D):	<u>1.4</u>
		Time of Collection:	<u>1038</u>	Surveyed elevation (NVGD 29) (E):	<u>NA</u>
		Time Depart Station:	<u>1041</u>	Water surface from surveyed elevation (F):	<u>1.5</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt	Black	loose	fine			some streaking of silt layer
1.1		Clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

slight sheen on surface of core

Page 1 of 1

Station ID: <u>0026</u>	Time On Station: <u>1106</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-0026-00-14</u>	Northing (NAD 83): <u>2704795.93</u>	Water Depth (A): <u>6.8</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>515349.49</u>	Length of push core assembly (B): <u>9.6</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.22</u>	Water surface to top of handle (C): <u>0.7</u>
Date: <u>11/16/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>
	Time of Collection: <u>1111</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1112</u>	Water surface from surveyed elevation (F): <u>1.6</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ 1.6
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -6.7
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -6.0
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -5.3
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -5.2
 (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt	Dark Brown	loose	fine			
1.0		Silt	Black	med loose	fine			} maybe silt clay mix
0.7		Clay	olive gray	firm	fine			
0.0								

S-07D-0026-00-07

TOP 0.7' was sampled
for PCB + TOC/GS analysis
on 12/12/07
JMF/MW

File ID of digital photograph(s):

Comments:

Station ID: <u>0032</u>	Time On Station: <u>1128</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-0032-00-14</u>	Northing (NAD 83): <u>2704645.64</u>	Water Depth (A): <u>7.2</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815350.44</u>	Length of push core assembly (B): <u>10.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.51</u>	Water surface to top of handle (C): <u>1.3</u>	
Date: <u>11/16/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>	
	Time of Collection: <u>1132</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1134</u>	Water surface from surveyed elevation (F): <u>12.0</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ 2.0

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ -6.7

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ -6.1

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ -5.3

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ -5.2

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt over silt clay	Brown Black	loose	fine			Appears some mixing of layers due to Dredge or Debris Removal S-07D-0032-00-08 TOP 0.8' Sampled for PCB + TOC/SS analysis on 12/12/07 JMF/MW
0.6		Clay with some silt streaks	Olive gray Black streaks	Firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel: <u>R/V Gale Force</u>			
		Client: <u>USACE NAE</u>		Chief Scientist: <u>M. Walsh</u>			

Station ID: <u>0038</u>	Time On Station: <u>1148</u>	All measurements are ±0.1 feet
Core Sample ID: <u>S-07D-0038-00-1.7</u>	Northing (NAD 83): <u>2704498.3</u>	Water Depth (A): <u>8.2</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815349.9</u>	Length of push core assembly (B): <u>12.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>4.65</u>	Water surface to top of handle (C): <u>1.9</u>
Date: <u>11/16/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.7</u>
	Time of Collection: <u>1155</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1157</u>	Water surface from surveyed elevation (F): <u>+1.9</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>1.9</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-8.2</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-7.0</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-6.5</u>
(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-6.3</u>
<p>(Note if I ≠ I₂ within ± 1.0 feet, discard and resample)</p>	

#	Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.7		Silt	Brown Black	loose	fine			S-07D-0038-00-05 TOP 0.5' sampled for PCB + TOC/GS analysis on 12/12/07 JMF/MW
	1.2		Clay	olive gray	firm	fine			
	0.0								

File ID of digital photograph(s):
 Comments:

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422	
Location: New Bedford, MA		Vessel: R/V Gale Force		Chief Scientist: M. Walsh	
Client: USACE NAE					

Station ID: 0042	Time On Station: 0909	All measurements are ± 0.1 feet	
Core Sample ID: S-07D-0042-06-18	Northing (NAD 83): 2704999.8	Water Depth (A): 484.9	
Logged by: MW	Easting (NAD 83): 915356.2	Length of push core assembly (B): 7.9	
Collection Mechanism: Push-Core	GPS Accuracy: 2.58	Water surface to top of handle (C): 1.6	
Date: 11/20/07	Predicted Tide (ft): NA	Length of core (from bottom) (D): 6.8	
	Time of Collection: 0720	Surveyed elevation (NVGD 29) (E): NA	
	Time Depart Station: 0934	Water surface from surveyed elevation (F): NA - 0.8	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>70.8</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-7.6</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.6</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-5.8</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.7</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.8		Silt	brown	very loose	fine			
1.5		silt clay	black	loose	fine			
1.0								Mixed Clay Silt layer
0.0		Clay	olive gray	firm	fine			some streaking

File ID of digital photograph(s):

Comments: **1st attempt N/A**

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>		Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel: <u>R/V Gale Force</u>	
		Client: <u>USACE NAE</u>		Chief Scientist: <u>M. Walsh</u>	

Station ID: <u>MM 22</u>	Time On Station: <u>1000</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-MM22-00-10</u>	Northing (NAD 83): <u>2704898.1</u>	Water Depth (A): <u>4.9</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815301.99</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2-94</u>	Water surface to top of handle (C): <u>1.8</u>	
Date: <u>11/26/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.0</u>	
	Time of Collection: <u>10:00</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>10:10</u>	Water surface from surveyed elevation (F): <u>-0.7</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.7</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-6.9</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.4</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-5.9</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.6</u>

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.0		Silt	Black	loose	fine			Top half appears mottled and mixed
0.5		Clay	Olive gray	fine	fine			S-07D-MM22-00-05
0.0								Sampled TOP 0.5' for PCB + TOC/GS analysis on 12/12/07 JMF/MW
								Only sheen seen when processing sample 12/12/07 JMF

File ID of digital photograph(s):
 Comments:

Station ID: <i>HH22</i>	Time On Station: <i>1015</i>	All measurements are ± 0.1 feet
Core Sample ID: <i>S-07D-HH22-00-16</i>	Northing (NAD 83): <i>2764844.2</i>	Water Depth (A): <i>5.1</i>
Logged by: <i>MW</i>	Easting (NAD 83): <i>815173.9</i>	Length of push core assembly (B): <i>3.0</i>
Collection Mechanism: <i>Push-Core</i>	GPS Accuracy: <i>2.35</i>	Water surface to top of handle (C): <i>1.0</i>
Date: <i>11/20/07</i>	Predicted Tide (ft): <i>NA</i>	Length of core (from bottom) (D): <i>1.6</i>
	Time of Collection: <i>1020</i>	Surveyed elevation (NVGD 29) (E): <i>NA</i>
	Time Depart Station: <i>1027</i>	Water surface from surveyed elevation (F): <i>-0.7</i>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

<i>-0.7</i>
<i>-7.7</i>
<i>-7.1</i>
<i>-6.1</i>
<i>-5.8</i>
<i>-</i>

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<i>1.6</i>		<i>Silt</i>	<i>very Black</i>	<i>loose</i>	<i>fine</i>			<i>S-07D-HH22-00-10</i>
<i>0.6</i>		<i>clay</i>	<i>olive gray</i>	<i>firm</i>	<i>fine</i>			<i>Sample taken on 12/14/07</i>
<i>0.0</i>								<i>from TOP 1.0' for PCB</i>
								<i>+ TOC/BS analysis</i>
								<i>JMF/MW</i>

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>		Vessel: <u>R/V Gale Force</u>			
		Client: <u>USACE NAE</u>		Chief Scientist: <u>M. Walsh</u>			

Station ID: <u>II 25</u>	Time On Station: <u>1033</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-II 25-00-14</u>	Northing (NAD 83): <u>2704836.88</u>	Water Depth (A): <u>4.9</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815201.0</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>1.93</u>	Water surface to top of handle (C): <u>1.5</u>
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>
	Time of Collection: <u>1033</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1040</u>	Water surface from surveyed elevation (F): <u>-0.7</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.7</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-7.2</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.2</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-5.8</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.6</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt	brown black	loose	fine			
1.0								
0.0		clay	olive gray	firm	fine			0.7 to 1.0 of clay layer is broken with some silt mixing in this zone. S-07D-II 25-00-14 Samples taken from TOP 0.4 for PCB + TOC/GS analysis on 12/11/07 IMF/MW

File ID of digital photograph(s):
 Comments:

Station ID: <u>KK27</u>	Time On Station: <u>1054</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-KK27-00-14</u>	Northing (NAD 83): <u>270771.6</u>	Water Depth (A): <u>4.6</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815250.9</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.24</u>	Water surface to top of handle (C): <u>1.7</u>
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>
	Time of Collection: <u>1100</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1103</u>	Water surface from surveyed elevation (F): <u>-0.7</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-0.7

-7.0

-6.5

-5.6

-5.3

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		Silt	black	very loose	fine			Two distinguished upper silt layers
1.1		Silt	black	loose	fine			
0.5		Clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422	
		Location: New Bedford, MA		Vessel: S/V Gale Force	
		Client: USACE NAE		Chief Scientist: m.valyn	

Station ID: 6629	Time On Station: 1112	All measurements are ± 0.1 feet	
Core Sample ID: S-07D-6629-00-13	Northing (NAD 83): 2704717.44	Water Depth (A): 38	
Logged by: HW	Easting (NAD 83): 815149.61	Length of push core assembly (B): 8.0	
Collection Mechanism: Push-Core	GPS Accuracy: 2.77	Water surface to top of handle (C): 2.9	
Date: 11/20/07	Predicted Tide (ft): NA	Length of core (from bottom) (D): 1.3	
	Time of Collection: 1113	Surveyed elevation (NVGD 29) (E): NA	
	Time Depart Station: 1122	Water surface from surveyed elevation (F): -0.6	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.6</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-5.7</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-5.0</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-4.4</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-4.4</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.3		silt	brown	loose	fine			flock/silt some streaking S-07D-6629-00-06 Sample taken from TOP 0.6 for PCB + TOC/GS analysis on 12/11/07 JMF
1.2		silt	black	loose	fine			
0.7		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):
 Comments:

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>				Vessel: <u>SV Gale Force</u>	
		Client: <u>USACE NAE</u>				Chief Scientist: <u>m.walsh</u>	

Station ID: <u>KK32</u>	Time On Station: <u>1127</u>	All measurements are ±0.1 feet
Core Sample ID: <u>S-07D-KK32-00-15</u>	Northing (NAD 83): <u>2704049.3</u>	Water Depth (A): <u>5.3</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815247.88</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.05</u>	Water surface to top of handle (C): <u>1.0</u>
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>
	Time of Collection: <u>1133</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1135</u>	Water surface from surveyed elevation (F): <u>-0.5</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	-0.5
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-7.5
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-6.9
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-6.0
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-5.8
(Note if I ≠ I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		Silt	Brown Black	loose	fine			Two distinguished silt layer
1.0		Silt	Black	loose	fine			
0.6		Clay	Olive gray	firm	fine			
0.0								S-07D-KK32-00-09 Samples taken from TOP 0.9' for PCB + TOC/GS analysis 12/11/07 DMF/MW

File ID of digital photograph(s):
 Comments:

Station ID: <u>LL40</u>	Time On Station: <u>1149</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-LL40-00-12</u>	Northing (NAD 83): <u>2704449.3</u>	Water Depth (A): <u>5.9</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815274.3</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.05</u>	Water surface to top of handle (C): <u>0.9</u>
Date: <u>11/26/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.2</u>
	Time of Collection: <u>1155</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1157</u>	Water surface from surveyed elevation (F): <u>-0.4</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

-0.4

-7.5

-6.7

-6.3

-6.3

-

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		Silt	Brown Black	loose	fine			
0.8		Clay (some shells)	olive gray	firm	fine (med)			Silt + clay layer is sloped
0.0								S-07D-LL40-00-03
								Sampled TOP 0.3'
								for PCB + TOC/GS
								analysis on 12/12/07
								JMP/mw

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: S/V Gale Force		Chief Scientist: M. Valish	
		Client: USACE NAE					

Station ID: <u>II36</u>	Time On Station: <u>1303</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-II36-00-15</u>	Northing (NAD 83): <u>2704550.7</u>	Water Depth (A): <u>5.4</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815199.8</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.42</u>	Water surface to top of handle (C): <u>0.8</u>	
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.5</u>	
	Time of Collection: <u>1308</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1311</u>	Water surface from surveyed elevation (F): <u>-0.2</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-0.2</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-7.4</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.5</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-5.9</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.6</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

#	Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
	1.5								
	0.9		silt	Black	loose	fine			Signet seen on surface of core
			clay	olive gray	firm	fine			S-07D-II36-00-06
	0.0								Sample taken from TOP 0.6
									for PCB & TOC/As
									analysis on 12/11/07
									only

File ID of digital photograph(s):
 Comments:

Station ID: <u>HH42</u>	Time On Station: <u>1216</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-HH42-00-16</u>	Northing (NAD 83): <u>2704399.7</u>	Water Depth (A): <u>5.9</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>81517506</u>	Length of push core assembly (B): <u>8.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.03</u>	Water surface to top of handle (C): <u>0.4</u>
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.6</u>
	Time of Collection: <u>1220</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1223</u>	Water surface from surveyed elevation (F): <u>-0.1</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-0.1

-7.7

-6.9

-6.1

-6.0

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.6		silt	Brown	loose	fine			Flocy Brown silt layer mixed with black silt on top layer
1.3		silt	Black	loose	fine			
0.8		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: S/V Gale Force		Chief Scientist: m.walsh	
		Client: USACE NAE					

Station ID: <u>GG33</u>	Time On Station: <u>1229</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-6633-00-14</u>	Northing (NAD 83): <u>2704623.5</u>	Water Depth (A): <u>5.4</u>	
Logged by: <u>mw</u>	Easting (NAD 83): <u>815149.65</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.24</u>	Water surface to top of handle (C): <u>1.0</u>	
Date: <u>11/26/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>1.4</u>	
	Time of Collection: <u>1232</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1236</u>	Water surface from surveyed elevation (F): <u>-0.6</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	-0.1
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	-7.1
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	-6.3
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	-5.7
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	-5.5
(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.4		silt	Black	loose	fine			some streaking S-07D-6633-00-06 Sampled top "6" for PCB+TOC/GS analysis ①
0.8		clay	Olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments: ① added w/ AEM 12/18/07

Station ID: <u>DD24</u>	Time On Station: <u>1241</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-09D-DD24-00-23</u>	Northing (NAD 83): <u>2704849.9</u>	Water Depth (A): <u>5.75.6</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815047.0</u>	Length of push core assembly (B): <u>8.080</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.45</u>	Water surface to top of handle (C): <u>1.08</u>
Date: <u>11/20/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.3</u>
	Time of Collection: <u>1259</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1302</u>	Water surface from surveyed elevation (F): <u>-0.1 + 0.2</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>0.2</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-8.0</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-6.9</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-5.7</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.4</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.3		Silt	Brown Black	Very loose	fine			Fluffy Brown silt layer
2.1		Silt	Black	loose	fine			
1.1								some streaking
0.0		Clay (wood shells)	dark gray	firm	fine to (med)			

File ID of digital photograph(s):

Comments:

1st Aug 04 N/G

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring			Project #: G606422	
		Location: New Bedford, MA			Vessel: S/V Gale Force	
		Client: USACE NAE			Chief Scientist: M. WALSH	

Station ID:	DD 22	Time On Station:	1309	All measurements are ± 0.1 feet	
Core Sample ID:	S-07D-DD22-00-20	Northing (NAD 83):	2704899.9	Water Depth (A):	6.1
Logged by:	MW	Easting (NAD 83):	815035.2	Length of push core assembly (B):	9.0
Collection Mechanism:	Push-Core	GPS Accuracy:	4.65	Water surface to top of handle (C):	0.6
Date:	11/20/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	2.0
		Time of Collection:	1313	Surveyed elevation (NVGD 29) (E):	NA
		Time Depart Station:	1316	Water surface from surveyed elevation (F):	+0.5

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>0.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-8.0 - 7.9</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-8.9 - 7.0</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-8.9 - 5.9</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-5.9 - 5.6</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.0		Silt	Black	loose	fine			noticeable layering of silt shaking at Trans. Thin veneer of silt at 0.4 S-07D-DD22-00-11 Samples for PCB/T + QA splits taken top 1.1' on 12/11/07 <div style="text-align: right;">JMF</div>
1.7		Silt	Black	loose	fine			
1.5		Silt	Black	loose	fine			
0.9								
0.4		Clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):
 Comments:

- Live small quahog/clams on surface of core

W.D.S. 11/24/07

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422	
		Location: New Bedford, MA		Vessel: SV Gale Force	
		Client: USACE NAE		Chief Scientist: M. Walsh	

Station ID: <u>D040</u>	Time On Station: <u>0756</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-D040-06-27</u>	Northing (NAD 83): <u>2704450.15</u>	Water Depth (A): <u>10.540</u>	<u>11.61</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815075.4</u>	Length of push core assembly (B): <u>16.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.33</u>	Water surface to top of handle (C): <u>2.0</u>	
Date: <u>11/28/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>28.7</u>	
	Time of Collection: <u>1031</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1033</u>	Water surface from surveyed elevation (F): <u>2.4</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>2.4</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-11.6</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-10.5</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-8.9</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-8.7</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<u>2.7</u> <u>2.6</u>		<u>silt/Flack</u>	<u>Brown</u>	<u>loose</u>	<u>fine</u>			<u>ulva (sea lettuce) on surface</u>
<u>1.1</u>		<u>silt</u>	<u>Black</u>	<u>loose</u>	<u>fine</u>			
<u>0.0</u>		<u>Clay</u>	<u>olive gray</u>	<u>firm</u>	<u>fine</u>			<u>some ulva on very Bottom</u>

File ID of digital photograph(s):

Comments:
1st Attempt N/G
2nd Attempt N/G

Station ID: <u>DD36</u>	Time On Station: <u>1043</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-DD36-00-20</u>	Northing (NAD 83): <u>2704839.2</u>	Water Depth (A): <u>10.0</u>
Logged by: <u>mw</u>	Easting (NAD 83): <u>815084.3</u>	Length of push core assembly (B): <u>13.3</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.87</u>	Water surface to top of handle (C): <u>1.0</u>
Date: <u>11/28/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.0</u>
	Time of Collection: <u>1050</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>
	Time Depart Station: <u>1058</u>	Water surface from surveyed elevation (F): <u>+2.4</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.0		Silt/Black	Black	loose	fine			
1.6		Silt	Black	loose	fine			S-07D-DD36-00-20
0.8		Clay	olive gray	firm	fine			
0.0								
								Samples taken from TOP 1.2' for PCB + TOC/GS analysis on 12/11/07 JMF * Bottom 0.2' was not sampled because it was clay

File ID of digital photograph(s):

Comments:

Page 1 of 1

Station ID: <u>EE41</u>	Time On Station: <u>1128</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-EE41-00-23</u>	Northing (NAD 83): <u>2704424.2</u>	Water Depth (A): <u>9.0</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815100.6</u>	Length of push core assembly (B): <u>13.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.41</u>	Water surface to top of handle (C): <u>1.5</u>
Date: <u>11/28/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.3</u>
	Time of Collection: <u>1135</u>	Surveyed elevation (NVGD 29) (E): <u>14</u>
	Time Depart Station: <u>1139</u>	Water surface from surveyed elevation (F): <u>+1.8</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H_1 + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

-9.7 0.1.8

-9.7

-8.8

-7.4

-7.2

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.3		Some Floc	Black	loose	fine			S-07D-EE41-00-14
0.9		Silt	Black	loose	fine			
0.0		clay	Black gray	firm	fine			Sample taken from TOP 1.4' for T-CEB + TOC/bs on 12/11/07 JMF/MW Homologues!

File ID of digital photograph(s):

Comments:

① wj. JS. 11/29/07

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: S/V Gale Force			
		Client: USACE NAE		Chief Scientist: M. Walsh			

Station ID: <u>DD31</u>	Time On Station: <u>1146</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-DD31-08-20</u>	Northing (NAD 83): <u>3704675.3</u>	Water Depth (A): <u>7.8</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815074.4</u>	Length of push core assembly (B): <u>11.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.27</u>	Water surface to top of handle (C): <u>1.0</u>	
Date: <u>11/28/07</u>	Predicted Tide (ft): <u>NA</u>	Length of core (from bottom) (D): <u>2.0</u>	
	Time of Collection: <u>1153</u>	Surveyed elevation (NVGD 29) (E): <u>NA</u>	
	Time Depart Station: <u>1158</u>	Water surface from surveyed elevation (F): <u>+1.5</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>1.5</u>
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-8.5</u>
(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-7.5</u>
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-6.5</u>
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-6.3</u>
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	<u>✓</u>

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
2.0		Silt	Black	loose	fine			<p>S-07D-DD31-08-10</p> <p>same streaking</p> <p>Samples taken from Top 1.0' for PCB + TOC/GI analysis on 12/11/07</p> <p style="text-align: right;">JMF/mw</p>
1.0		clay	olive gray	firm	fine			
0.0								

File ID of digital photograph(s):

Comments:

Battelle

The Business of Innovation

Project Name: **New Bedford Harbor Environmental Monitoring**Project #: **G606422**Location: **New Bedford, MA**Vessel: **R/V Gale Force**Client: **USACE NAE**

Chief Scientist:

Station ID: <u>AA22</u>	Time On Station: <u>1339</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-AA22-00-50</u>	Northing (NAD 83): <u>2704887.3</u>	Water Depth (A): <u>1.8</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815000.6</u>	Length of push core assembly (B): <u>9.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.5</u>	Water surface to top of handle (C): <u>0.6</u>
Date: <u>12/11/07</u>	Predicted Tide (ft): <u>-1.2</u>	Length of core (from bottom) (D): <u>5.0</u>
	Time of Collection: <u>1350</u>	Surveyed elevation (NVGD 29) (E):
	Time Depart Station: <u>1444</u>	Water surface from surveyed elevation (F): <u>-1.2</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

-1.2	①
-8.6	①
-7.3	①
-3.6	①
-3	①
✓	①

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
5.0								
		Silt	Black	loose ↓ firm	Fine			S-07D-AA22-10-20 Sampled 1-2' interval for PCB + TOC analysis on 12/12/07 JMF/mw
1.3		Clay	Olive	firm	Fine			VOA samples sampled on 12/11/07 @ time of collection
0.0								S-07D-AA22-02-03 MS/MS also collected

File ID of digital photograph(s):

Comments:

Sheen on the outside of the core
Acrid odor
O AEM 12/13/07

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: R/V Gale Force			
		Client: USACE NAE		Chief Scientist:			

Station ID:	<u>AA22 DUP</u>	Time On Station:	<u>1339</u>	All measurements are ± 0.1 feet	
Core Sample ID:	<u>S-07D-AA22-DUP-00-49</u>	Northing (NAD 83):	<u>27048873</u>	Water Depth (A):	<u>9.1</u> <u>2.0</u>
Logged by:	<u>JMF</u>	Easting (NAD 83):	<u>815000.6</u>	Length of push core assembly (B):	<u>8.0</u> <u>8.0</u>
Collection Mechanism:	<u>Push-Core</u>	GPS Accuracy:	<u>2.5</u>	Water surface to top of handle (C):	<u>0.8</u> <u>4.2</u>
Date:	<u>12/11/07</u>	Predicted Tide (ft):	<u>-</u>	Length of core (from bottom) (D):	<u>4.9</u>
		Time of Collection:	<u>1412</u>	Surveyed elevation (NVGD 29) (E):	
		Time Depart Station:	<u>1444</u>	Water surface from surveyed elevation (F):	<u>-1.2</u>

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$	<u>-1.2</u> ①
(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$	<u>-8.4</u> ①
(z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$	<u>-7.4</u> ①
(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$	<u>-3.9</u> ①
(I ₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$	<u>-3.3</u> ①
(Note if I \neq I ₂ within ± 1.0 feet, discard and resample)	<u>✓</u> ①

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
4.9								S-07D-AA22-10-20-RE Sampled 1-2' interval for PCB + TOC/GS analysis on 12/12/07 JMF/ew VOA Samples taken from 0.2-0.3 section of core S-07D-AA22-02-03-REP
1.0		silt	Black	loose ↓ firm	fine			
0.0		clay	olive	firm	fine			

File ID of digital photograph(s):
 Comments:

Sheen on the outside of the core
 acrid odor
 ① AEM 12/13/07

OU3 Pilot Cap Samples

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Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring

Location: New Bedford, MA

Project #: G606422

Chief Scientist: Theresa Himmer

Client: USACE NAE

Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3

Station Depth (feet): 12.9

Station ID: 0405

Time on Station: 0911

Date: 9/18/07

Time Depart Station: 0928

Recorded by: MW

Attempt #1

Northing: 2686188.27

Grab Size: 0.1-m²

Easting: 815199.44

Analyses : PCBs

Collection Time: 0918 0924

Sample ID: S-07B-0405-00-03

Sample Description: Fine sand with dark silt and med brown sand below

Attempt #2

Latitude:

Grab Size: 0.1-m²

Longitude:

Analyses : PCBs

Time:

Sample ID:

Sample Description: 1st Attempt N/G

Additional Comments: - Completely Flat Bottom noted on Echosounder

Field Measurements

Survey ID: 2007 OU-3

Station Depth (feet): 13.2

Station ID: 0406

Time on Station: 0935

Date: 9/18/07

Time Depart Station: 0950

Recorded by: MW

Attempt #1

Northing: 2686190.2

Grab Size: 0.1-m²

Easting: 817951.0

Analyses : PCBs

Collection Time: 0944 0945

Sample ID: S-07B-0406-00-03

Sample Description: 1st Attempt N/G

- Gray Brown sand on surface with black silt and sand below.

- Completely Flat Bottom noted on Echosounder

Attempt #2

Latitude:

Grab Size: 0.1-m²

Longitude:

Analyses : PCBs

Time:

Sample ID:

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
Project #: G606422
Client: USACE NAE

Location: New Bedford, MA
Chief Scientist: Theresa Himmer
Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): ~~14.0~~ 13.5
Station ID: 0462 Time on Station: ~~10:02~~ 10:14
Date: 9/18/07 Time Depart Station: 10:20
Recorded by: TH

Attempt #1

Northing: 2685862.09 Grab Size: 0.1-m²
Easting: 818148.65 Analyses: PCBs
Collection Time: 10:15
Sample ID: S-07B-0462-00-03

Sample Description: red sand - gray brown on top, dk gray black
below below 1/2 cm

Attempt #2

Latitude: Grab Size: 0.1-m²
Longitude: Analyses: PCBs
Time:
Sample ID:

Sample Description:

Additional Comments: Flat bottom - med. - could not see any ridges
on depth finder.

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): ~~4.5~~ 10.0'
Station ID: 0461 Time on Station: 13:03
Date: 9/18/07 Time Depart Station: 13:18
Recorded by: TH

Attempt #1

Northing: 2685668.45 Grab Size: 0.1-m²
Easting: 817987.27 Analyses: PCBs
Collection Time: ~~13:04~~ 13:06 ← 13:10
Sample ID: S-07B-0461-00-03

Sample Description:

Ridge location - att's 1-2 - No good - very rocky bottom
med. well sorted sand

Attempt #2

Latitude: Grab Size: 0.1-m²
Longitude: Analyses: PCBs
Time:
Sample ID:

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
 Project #: G606422
 Client: USACE NAE

Location: New Bedford, MA
 Chief Scientist: Theresa Himmer
 Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 12.0'
 Station ID: 0497 Time on Station: 13:34
 Date: 9/18/07 Time Depart Station: 13:40
 Recorded by: TH

Attempt #1

Northing: 2686019.63 Grab Size: 0.1-m²
 Easting: 817780.93 Analyses: PCBs
 Collection Time: 13:30
 Sample ID: 5-078-0497-00-03

Sample Description: VALLEY LOCATION - well sorted - med sand - gray brown
 on top ; gray black below ~1/2 cm

Attempt #2

Latitude: Grab Size: 0.1-m²
 Longitude: Analyses: PCBs
 Time:
 Sample ID:

Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 12.1'
 Station ID: 0498 Time on Station: 14:00
 Date: 9/18/07 Time Depart Station: 14:10
 Recorded by: TH

Attempt #1

Northing: 2686237.32 Grab Size: 0.1-m²
 Easting: 817748.31 Analyses: PCBs
 Collection Time: 14:01
 Sample ID: 5-078-0498-00-03

Sample Description: VALLEY LOCATION - f-med well sorted sand gray brown
 on top dk gray - black below ~1/2 cm

Attempt #2

Latitude: Grab Size: 0.1-m²
 Longitude: Analyses: PCBs
 Time:
 Sample ID:

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
Project #: G606422
Client: USACE NAE

Location: New Bedford, MA
Chief Scientist: Theresa Himmer
Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3
Station ID: 0404
Date: 10/18/09
Recorded by: JMH

Station Depth (feet): 14.8
Time on Station: 11:30
Time Depart Station: 11:55

Attempt #1

Northing: 2686000.43 2686001.73
Easting: 818044.04 818044.31
Collection Time: 11:49
Sample ID: 5-078-0404-00-03

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Additional Comments: Could not see and any redges on depth fender.

Field Measurements

Survey ID: 2007 OU-3
Station ID: 0403
Date: 9/18/09
Recorded by: TH

Station Depth (feet): 12.5
Time on Station: 12:30
Time Depart Station: 12:39

Attempt #1

Northing: 2685849.97
Easting: 817883.32
Collection Time: 12:32
Sample ID: 5-078-0403-00-03

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
Project #: G606422
Client: USACE NAE

Location: New Bedford, MA
Chief Scientist: Theresa Himmer
Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3
Station ID: 0411
Date: 9/18/07
Recorded by:

Station Depth (feet): 10.5
Time on Station: 2:14:20
Time Depart Station:

Attempt #1

Northing: 2686372.41
Easting: 817641.99
Collection Time: 14:23
Sample ID: S-07B-0411-00-03

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description: Ridge location - med sand gray brown on top.
Dk gray - black below ~1/2cm

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3
Station ID: 0409
Date: 9/18/07
Recorded by: TH

Station Depth (feet): 11.5
Time on Station: 14:38
Time Depart Station: 14:47

Attempt #1

Northing: 2686123.70
Easting: 817487.77
Collection Time: 14:40
Sample ID: S-07B-0409-00-03

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description: Valley location - med sand brown gray on top gray
black below ~1/2cm

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses: PCBs

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
 Project #: G606422
 Client: USACE NAE

Location: New Bedford, MA
 Chief Scientist: Theresa Himmer
 Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 11.9'
 Station ID: 0410 Time on Station: 14:55
 Date: 9/18/07 Time Depart Station: 1511
 Recorded by: TH

Attempt #1

Northing: 2686245.63 Grab Size: 0.1-m²
 Easting: 817480.20 Analyses: PCBs
 Collection Time: 14:58 - NG 2nd = 15:01 - NG 3rd = 15:05 - NG
 Sample ID: S-07B-0410-00-03 4th = 15:09 - good
 Sample Description: VALLEY LOCATION - 1st AT = NG - lots of seaweed

Attempt #2

Latitude: Grab Size: 0.1-m²
 Longitude: Analyses: PCBs
 Time: Sample ID: Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 9.0
 Station ID: 0413 Time on Station: 0830
 Date: 9/19/07 Time Depart Station: 0855
 Recorded by: MW/TH

Attempt #1

Northing: 2686397.53 Grab Size: 0.1-m²
 Easting: 817309.45 Analyses: PCBs
 Collection Time: 0836
 Sample ID: S-07B-0413-00-03
 Sample Description: Valley Location
 Fine to med Sand olive Brown over Black /

Attempt #2

Latitude: 2686397.53 Grab Size: 0.1-m²
 Longitude: 817309.45 Analyses: PCBs
 Time: 0848
 Sample ID: S-07B-0413-00-03-DWP
 Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
 Project #: G606422
 Client: USACE NAE

Location: New Bedford, MA
 Chief Scientist: Theresa Himmer
 Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 11.1
 Station ID: 0U12 Time on Station: 0900
 Date: 9/19/07 Time Depart Station: 0921
 Recorded by: MW/JH

Attempt #1

Northing: 2686487.64 Grab Size: 0.1-m²
 Easting: 817490.28 Analyses: PCBs
 Collection Time: ~~0905-0908~~ 0914
 Sample ID: S-078-0U12-00-03

Sample Description: 1st attempt = NG Valley Location
 2nd attempt = NG
 olive brown over black w/ seaweed & limpet shells / fine sand, silt

Attempt #2

Latitude: Grab Size: 0.1-m²
 Longitude: Analyses: PCBs
 Time:
 Sample ID:

Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3 Station Depth (feet): 10.0
 Station ID: 0U14 Time on Station: 0930
 Date: 9/19/07 Time Depart Station: 0939
 Recorded by: MW/JH

Attempt #1

Northing: 2686643.69 Grab Size: 0.1-m²
 Easting: 817323.38 Analyses: PCBs
 Collection Time: 0932
 Sample ID: S-078-0U14-00-03

Sample Description: Valley location
 dense fine sand olive brown over gray w/ seaweed

Attempt #2

Latitude: Grab Size: 0.1-m²
 Longitude: Analyses: PCBs
 Time:
 Sample ID:

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
 Project #: G606422
 Client: USACE NAE

Location: New Bedford, MA
 Chief Scientist: Theresa Himmer
 Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3	Station Depth (feet): 8.7
Station ID: 0415	Time on Station: 0950
Date: 9/19/07	Time Depart Station: 1000
Recorded by: mw/JH	

Attempt #1

Northing: 2686715.27	Grab Size: 0.1-m ²
Easting: 817494.06	Analyses : PCBs
Collection Time: 0952	
Sample ID: S-07B-0415-00-03	

Sample Description: Ridge location
 olive brown over dark gray / clay content in fine sand

Attempt #2

Latitude:	Grab Size: 0.1-m ²
Longitude:	Analyses : PCBs
Time:	
Sample ID:	

Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3	Station Depth (feet): 10.8
Station ID: 0416	Time on Station: 10:12
Date: 9/19/07	Time Depart Station: 1019
Recorded by: mw/JH	

Attempt #1

Northing: 2686837.43	Grab Size: 0.1-m ²
Easting: 817326.43	Analyses : PCBs
Collection Time: 1014	
Sample ID: S-07B-0416-00-03	

Sample Description: Valley location
 olive brown over black fine sand w/ silt / seaweed

Attempt #2

Latitude:	Grab Size: 0.1-m ²
Longitude:	Analyses : PCBs
Time:	
Sample ID:	

Sample Description:

Additional Comments:

Station Log for Benthic Sediment Grab Samples

Project Name: New Bedford Harbor Environmental Monitoring
Project #: G606422
Client: USACE NAE

Location: New Bedford, MA
Chief Scientist: Theresa Himmer
Vessel: R/V Gale Force

Field Measurements

Survey ID: 2007 OU-3
Station ID: 0417
Date: 9/19/07
Recorded by: mw/jh

Station Depth (feet): 7.1
Time on Station: 1029
Time Depart Station: 1045

Attempt #1

Northing: 2686804.30
Easting: 817189.50
Collection Time: 1032
Sample ID: S-07B-0U17-00-03

Grab Size: 0.1-m²
Analyses : PCBs

Sample Description: Ridge Location
medium sand olive gray / some pebbles & shells

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses : PCBs

Sample Description:

Additional Comments:

Field Measurements

Survey ID: 2007 OU-3
Station ID:
Date:
Recorded by:

Station Depth (feet):
Time on Station:
Time Depart Station:

Attempt #1

Northing:
Easting:
Collection Time:
Sample ID:

Grab Size: 0.1-m²
Analyses : PCBs

Sample Description:

Attempt #2

Latitude:
Longitude:
Time:
Sample ID:

Grab Size: 0.1-m²
Analyses : PCBs

Sample Description:

Additional Comments:

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Boat House Samples

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Station ID: BH2 Time On Station: 1052 All measurements are ± 0.1 feet
 Core Sample ID: S-07D-0BH2-00-34 Northing (NAD 83): 2701172.12 Water Depth (A): 707.1
 Logged by: MW Easting (NAD 83): 815093.66 Length of push core assembly (B): 12.0
 Collection Mechanism: Push-Core GPS Accuracy: 3.06 Water surface to top of handle (C): 1.1
 Date: 11/29/07 Predicted Tide (ft): _____ Length of core (from bottom) (D): 3.4
 Time of Collection: 1134 Surveyed elevation (NVGD 29) (E): _____
 Time Depart Station: 1137 Water surface from surveyed elevation (F): NA

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$ _____
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ _____
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ _____
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ _____
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ _____
 (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = 0)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.4		Silt	Black	loose	fine			S-07D-0BH2-00-10
1.0		Clay	Black/gray	med to firm	fine		①	S-07D-0BH2-10-20
0.0								S-07D-0BH2-20-30

File ID of digital photograph(s):

Comments:

seen on outside of core barrel

① Sample IDs for PCB + Archive
 00 is H₂O/Sed interface
 Subsampled 12/5/07 JMF

Station ID: <u>BH 3</u>	Time On Station: <u>1154</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-0BH3-00-35</u>	Northing (NAD 83): <u>2700971.5</u>	Water Depth (A): <u>6.5</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815038.1</u>	Length of push core assembly (B): <u>12.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.23</u>	Water surface to top of handle (C): <u>2.0</u>
Date: <u>11/29/07</u>	Predicted Tide (ft): <u></u>	Length of core (from bottom) (D): <u>3.5</u>
	Time of Collection: <u>1201</u>	Surveyed elevation (NVGD 29) (E): <u></u>
	Time Depart Station: <u>1206 1216</u>	Water surface from surveyed elevation (F): <u>N/A</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.5		Silt	Black	loose	fine			S-07D-0BH3-00-10
3.2		Silt	Black	loose	fine			S-07D-0BH3-10-20
1.4		Clay	olive gray	firm	fine			S-07D-0BH3-20-30
0.0		*						* lots of scallop shell hash

File ID of digital photograph(s):

Comments:

- ① Sample ID's for PCB + Archival Samples
00 is the water sediment interface for Samples
Subsampled 12/5/07 (previously all cores were frozen)

Station ID: <u>BH3 DWP</u>	Time On Station: <u>1154</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-0BH3-00-37-REP</u>	Northing (NAD 83): <u>2700971.5</u>	Water Depth (A): <u>6.3</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>875038.1</u>	Length of push core assembly (B): <u>12.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.23</u>	Water surface to top of handle (C): <u>1.8</u>
Date: <u>11/29/07</u>	Predicted Tide (ft): <u></u>	Length of core (from bottom) (D): <u>3.9</u>
	Time of Collection: <u>1212</u>	Surveyed elevation (NVGD 29) (E): <u></u>
	Time Depart Station: <u>1216</u>	Water surface from surveyed elevation (F): <u>N/A</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.9		Silt	Black	loose	fine			S-07D-0BH3-00-10-REP
3.8		Silt	Black	loose	fine			S-07D-0BH3-10-20-REP
1.7		Clay	olive gray	firm	fine			S-07D-0BH3-20-30-REP
0.0								

File ID of digital photograph(s):

Comments:

CORE ID = 101-1404 > Photo ID's
CORE = 101-1405

① Sample IDs for PCB+ Archives; on is the water/sediment interface
Subsampled on 12/5/07 (previously frozen)

Page of

Water surface from surveyed elevation (F): *N/A*

(Note if $I \neq I_2$ within ± 1.0 feet, discard and resample)

① Sample 1D's for PCB + Archive Samples; oo is the H_2O/Sed interface
subsampled on 12/5/07 JMF

Station ID: <u>BH8</u>	Time On Station: <u>0915</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-BH8-00-30</u>	Northing (NAD 83): <u>1700545.18</u>	Water Depth (A): <u>11/</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>314937.12</u>	Length of push core assembly (B): <u>11/</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.36</u>	Water surface to top of handle (C): <u>11/</u>
Date: <u>11/30/07</u>	Predicted Tide (ft): <u></u>	Length of core (from bottom) (D): <u>2.1</u>
	Time of Collection: <u>0920</u>	Surveyed elevation (NVGD 29) (E): <u>3.0</u>
	Time Depart Station: <u>0930</u>	Water surface from surveyed elevation (F): <u></u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.0		Sand with silt	gray Black	loose	fine to coarse			S-07D-BH8-00-10
2.8		Sand	light Brown	loose	fine to coarse			S-07D-BH8-10-20
1.6		Clay Sand mix	Olive gray	Firm	fine to med			S-07D-BH8-20-30
0.0								* PCB Homologue

File ID of digital photograph(s):

Comments:

Sample taken as soil sample
BH8 site moved West 3.5' and East 5.8'
Photo # 101-1417, 1418, 1419 (for site Ref)

① Sample ID's for PCB Homologue
00 is the H₂O/Sed interface
Subsampled 12/5/07 JMR
* PCB Homologue
* all depths

12/5/07 JMF

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA		Vessel: S/V Gale Force			
		Client: USACE NAE		Chief Scientist:			

Station ID: <u>BHS</u>	Time On Station: <u>10:13</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-0BHS-00-28</u>	Northing (NAD 83): <u>2700855.2</u>	Water Depth (A): <u>3.9</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815082.6</u>	Length of push core assembly (B): <u>10.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>3.03</u>	Water surface to top of handle (C): <u>2.1</u>	
Date: <u>11/30/07</u>	Predicted Tide (ft): _____	Length of core (from bottom) (D): <u>3.8</u>	
	Time of Collection: <u>1652</u>	Surveyed elevation (NVGD 29) (E): _____	
	Time Depart Station: <u>1058</u>	Water surface from surveyed elevation (F): <u>10.4</u>	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ _____

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ _____

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ _____

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ _____

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ _____

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.8		flick/silt	Brown/blk	loose	fine			S-07D-0BHS-00-10
3.5		silt	black	loose	fine			S-07D-0BHS-10-20
1.8		clay	olive gray	firm	fine			S-07D-0BHS-20-30
0.0								

File ID of digital photograph(s): _____

Comments:
Sample ID: 00 - is the water/sediment interface; subsampled 12/5/07
PCB + Archival Splits taken for each depth

Station ID: <u>BH9</u>	Time On Station: <u>1165</u>	All measurements are ± 0.1 feet
Core Sample ID: <u>S-07D-OBH9-00-33</u>	Northing (NAD 83): <u>2700554.8</u>	Water Depth (A): <u>3.5 4.0</u>
Logged by: <u>MW</u>	Easting (NAD 83): <u>815015.25</u>	Length of push core assembly (B): <u>10.0</u>
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.32</u>	Water surface to top of handle (C): <u>2.7</u>
Date: <u>11/30/07</u>	Predicted Tide (ft):	Length of core (from bottom) (D): <u>3.3</u>
	Time of Collection: <u>1128</u>	Surveyed elevation (NVGD 29) (E):
	Time Depart Station: <u>1134</u>	Water surface from surveyed elevation (F): <u>N/A</u>

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
- (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
3.3		Silt	Black	loose	fine			Sheen on outside of core S-07D-OBH9-00-18 S-07D-OBH9-10-20 S-07D-OBH9-20-30
1.9		Clay	gray	firm	fine			
0.5		Clay	olive	very	fine			
0.0			gray	firm				

File ID of digital photograph(s):

Comments:

1st Attempt no grain - Sheen
2nd Attempt N/G - Heavy Sheen
18' East and 8.6' North of original BH9 coordinates

① subsampled 12/5/07; 00 is the water-sediment interface

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Appendix B

PCB Analytical Data

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APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	N14-F07			I1			I4-F07		
Collection Date	11/5/07			11/6/07			11/6/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-0N14-00-05			S-07D-00I1-00-05			S-07D-00I4-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	1.933	MG/KG_DRYWT	D	5.18	MG/KG_DRYWT	D	3.361	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	4.383	MG/KG_DRYWT	D	11.64	MG/KG_DRYWT	D	7.812	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	4.519	MG/KG_DRYWT	D	11.82	MG/KG_DRYWT	D	8.709	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	2.752	MG/KG_DRYWT	D	8.044	MG/KG_DRYWT	D	5.621	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	11.26	MG/KG_DRYWT	D	27.5	MG/KG_DRYWT	D	17.9	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',4,5,5'-Pentacb (PCB 101)	1.694	MG/KG_DRYWT	D	6.665	MG/KG_DRYWT	D	4.481	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	0.216	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	3.01	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.216	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.863	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	1.852	MG/KG_DRYWT	D	0.222	MG/KG_DRYWT	DU	4.223	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.214	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU	0.222	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	74	MG/KG_DRYWT		180	MG/KG_DRYWT		150	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	K2			N4-F07			O1		
Collection Date	11/6/07			11/6/07			11/6/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-00K2-00-08			S-07D-00N4-00-06			S-07D-00O1-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	2.008	MG/KG_DRYWT	D	1.568	MG/KG_DRYWT	D	30.56	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	5.322	MG/KG_DRYWT	D	4.258	MG/KG_DRYWT	D	52.69	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	5.686	MG/KG_DRYWT	D	4.32	MG/KG_DRYWT	D	36.86	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	3.716	MG/KG_DRYWT	D	2.612	MG/KG_DRYWT	D	18.68	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	12.83	MG/KG_DRYWT	D	10.98	MG/KG_DRYWT	D	90.95	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',4,5,5'-Pentacb (PCB 101)	3.371	MG/KG_DRYWT	D	1.83	MG/KG_DRYWT	D	8.337	MG/KG_DRYWT	Dp
2,3,3',4,4'-Pentacb (PCB 105)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	2.425	MG/KG_DRYWT	D	1.307	MG/KG_DRYWT	D	3.169	MG/KG_DRYWT	Dp
2,2',3,3',4,4'-Hexacb (PCB 128)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	1.581	MG/KG_DRYWT	D	0.226	MG/KG_DRYWT	DU	5.076	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	3.023	MG/KG_DRYWT	D	2.043	MG/KG_DRYWT	D	8.469	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.217	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.125	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	100	MG/KG_DRYWT		75	MG/KG_DRYWT		660	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	Q9			J14			K5		
Collection Date	11/6/07			11/6/07			11/8/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-00Q9-00-05			S-07D-0J14-00-06			S-07D-00K5-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	2.055	MG/KG_DRYWT	D	22.38	MG/KG_DRYWT	D	5.151	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	5.291	MG/KG_DRYWT	D	42.16	MG/KG_DRYWT	D	13.38	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	6.351	MG/KG_DRYWT	D	39.64	MG/KG_DRYWT	D	16.12	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	3.481	MG/KG_DRYWT	D	13.73	MG/KG_DRYWT	D	11.15	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	12.73	MG/KG_DRYWT	D	46.98	MG/KG_DRYWT	D	32.39	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.213	MG/KG_DRYWT	DU	0.238	MG/KG_DRYWT	DJ	0.423	MG/KG_DRYWT	DJ
2,2',4,5,5'-Pentacb (PCB 101)	2.701	MG/KG_DRYWT	D	4.578	MG/KG_DRYWT	D	5.993	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	1.817	MG/KG_DRYWT	D	2.778	MG/KG_DRYWT	Dp	3.974	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	1.332	MG/KG_DRYWT	D	1.981	MG/KG_DRYWT	D	2.609	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	2.941	MG/KG_DRYWT	D	5.384	MG/KG_DRYWT	D	6.114	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.213	MG/KG_DRYWT	DU	0.524	MG/KG_DRYWT	DU	0.518	MG/KG_DRYWT	DU
Total MonoCB	0.071	MG/KG_DRYWT							
Total DiCB	6.75	MG/KG_DRYWT							
Total TriCB	34.91	MG/KG_DRYWT							
Total TetraCB	35.63	MG/KG_DRYWT							
Total PentaCB	21.39	MG/KG_DRYWT							
Total HexaCB	9.995	MG/KG_DRYWT							
Total HeptaCB	1.739	MG/KG_DRYWT							
Total OctaCB	0.369	MG/KG_DRYWT							
Total NonaCB	0.1	MG/KG_DRYWT							
DecaCB	0.04	MG/KG_DRYWT	D						
Total PCB Congeners (sum CONG x 2.6)	100	MG/KG_DRYWT		470	MG/KG_DRYWT		250	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)	110	MG/KG_DRYWT							

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	J10			J10			K21		
Collection Date	11/8/07			11/8/07			11/8/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	REP			SA			SA		
Samp ID	S-07D-0J10-00-07-REP			S-07D-0J10-00-07			S-07D-0K21-00-12		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	5.052	MG/KG_DRYWT	D	5.163	MG/KG_DRYWT	D	17.09	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	11.2	MG/KG_DRYWT	D	10.91	MG/KG_DRYWT	D	25.44	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	10.21	MG/KG_DRYWT	D	10.15	MG/KG_DRYWT	D	22.07	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	5.508	MG/KG_DRYWT	D	5.325	MG/KG_DRYWT	D	9.909	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	20.95	MG/KG_DRYWT	D	19.84	MG/KG_DRYWT	D	26.31	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	2.538	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	2.792	MG/KG_DRYWT	D	2.712	MG/KG_DRYWT	D	4.989	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	1.865	MG/KG_DRYWT	D	1.722	MG/KG_DRYWT	D	2.949	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	1.253	MG/KG_DRYWT	D	1.124	MG/KG_DRYWT	D	2.132	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	3.373	MG/KG_DRYWT	D	3.16	MG/KG_DRYWT	D	4.295	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.224	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU	0.216	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	160	MG/KG_DRYWT		160	MG/KG_DRYWT		310	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	M17			WW24			WW41		
Collection Date	11/8/07			11/14/07			11/14/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-0M17-00-06			S-07D-WW24-00-08			S-07D-WW41-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	9.768	MG/KG_DRYWT	D	7.544	MG/KG_DRYWT	D	2.324	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	21.4	MG/KG_DRYWT	D	14.2	MG/KG_DRYWT	D	4.902	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	19.61	MG/KG_DRYWT	D	16.49	MG/KG_DRYWT	D	6.073	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	9.723	MG/KG_DRYWT	D	8.161	MG/KG_DRYWT	D	2.95	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	38.16	MG/KG_DRYWT	D	18.67	MG/KG_DRYWT	D	8.623	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.563	MG/KG_DRYWT	DU	3.528	MG/KG_DRYWT	D	0.104	MG/KG_DRYWT	DU
2,2',4,5,5'-Pentacb (PCB 101)	4.808	MG/KG_DRYWT	D	8.23	MG/KG_DRYWT	D	2.028	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	3.015	MG/KG_DRYWT	D	5.64	MG/KG_DRYWT	D	1.562	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	1.865	MG/KG_DRYWT	D	2.536	MG/KG_DRYWT	D	0.105	MG/KG_DRYWT	DU
2,2',4,4',5,5'-Hexacb (PCB 153)	5.719	MG/KG_DRYWT	D	6.049	MG/KG_DRYWT	D	2.099	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.563	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.104	MG/KG_DRYWT	DU
Total MonoCB	0.211	MG/KG_DRYWT							
Total DiCB	33.06	MG/KG_DRYWT							
Total TriCB	115.1	MG/KG_DRYWT							
Total TetraCB	102.9	MG/KG_DRYWT							
Total PentaCB	47.42	MG/KG_DRYWT							
Total HexaCB	20.89	MG/KG_DRYWT							
Total HeptaCB	3.382	MG/KG_DRYWT							
Total OctaCB	0.647	MG/KG_DRYWT							
Total NonaCB	0.198	MG/KG_DRYWT							
DecaCB	0.048	MG/KG_DRYWT	D						
Total PCB Congeners (sum CONG x 2.6)	300	MG/KG_DRYWT		240	MG/KG_DRYWT		80	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)	320	MG/KG_DRYWT							

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	YY32			BBB23			OO26		
Collection Date	11/14/07			11/16/07			11/16/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-YY32-00-02			S-07D-BBB23-00-09			S-07D-OO26-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.514	MG/KG_DRYWT	D	0.09	MG/KG_DRYWT	D	9.751	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	1.066	MG/KG_DRYWT	D	0.27	MG/KG_DRYWT	D	17.82	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	1.536	MG/KG_DRYWT	D	0.383	MG/KG_DRYWT	D	22.22	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.707	MG/KG_DRYWT	D	0.141	MG/KG_DRYWT	D	12.41	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	2.272	MG/KG_DRYWT	D	0.602	MG/KG_DRYWT	D	24.09	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.328	MG/KG_DRYWT	D	0.038	MG/KG_DRYWT	D	4.04	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.673	MG/KG_DRYWT	D	0.161	MG/KG_DRYWT	D	10.67	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.036	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	0.558	MG/KG_DRYWT	D	0.128	MG/KG_DRYWT	D	6.557	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.028	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.34	MG/KG_DRYWT	D	0.075	MG/KG_DRYWT	D	3.488	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.659	MG/KG_DRYWT	D	0.178	MG/KG_DRYWT	D	7.978	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.044	MG/KG_DRYWT	Dp	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.063	MG/KG_DRYWT	D	8.40E-04	MG/KG_DRYWT	DpJ	0.226	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.067	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	23	MG/KG_DRYWT		5.4	MG/KG_DRYWT		310	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	OO32			OO38			SS29		
Collection Date	11/16/07			11/16/07			11/16/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-OO32-00-08			S-07D-OO38-00-05			S-07D-SS29-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	8.637	MG/KG_DRYWT	D	4.767	MG/KG_DRYWT	D	10.36	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	15.75	MG/KG_DRYWT	D	9.546	MG/KG_DRYWT	D	20.05	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	19.89	MG/KG_DRYWT	D	11.83	MG/KG_DRYWT	D	25.03	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	11.32	MG/KG_DRYWT	D	6.33	MG/KG_DRYWT	D	12.83	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	23.61	MG/KG_DRYWT	D	13.98	MG/KG_DRYWT	D	27.18	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	3.762	MG/KG_DRYWT	D	2.033	MG/KG_DRYWT	D	3.746	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	8.522	MG/KG_DRYWT	D	5.421	MG/KG_DRYWT	D	10.8	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	5.461	MG/KG_DRYWT	D	3.567	MG/KG_DRYWT	D	6.805	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	3.212	MG/KG_DRYWT	D	1.572	MG/KG_DRYWT	D	2.698	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	6.768	MG/KG_DRYWT	D	4.086	MG/KG_DRYWT	D	7.51	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.537	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	280	MG/KG_DRYWT		160	MG/KG_DRYWT		330	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	VV34			DD22			GG29		
Collection Date	11/16/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-VV34-00-10			S-07D-DD22-00-11			S-07D-GG29-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	8.823	MG/KG_DRYWT	D	16.1	MG/KG_DRYWT	D	57.24	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	19.2	MG/KG_DRYWT	D	28.76	MG/KG_DRYWT	D	88.21	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	27.65	MG/KG_DRYWT	D	37.96	MG/KG_DRYWT	D	111.9	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	14.62	MG/KG_DRYWT	D	23.09	MG/KG_DRYWT	D	53.84	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	29.4	MG/KG_DRYWT	D	35.32	MG/KG_DRYWT	D	93.05	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	6.297	MG/KG_DRYWT	D	8.043	MG/KG_DRYWT	D	19.35	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	14.05	MG/KG_DRYWT	D	24.83	MG/KG_DRYWT	D	49.14	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	9.455	MG/KG_DRYWT	D	13.79	MG/KG_DRYWT	D	25.53	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	4.017	MG/KG_DRYWT	D	5.927	MG/KG_DRYWT	D	12.46	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	9.947	MG/KG_DRYWT	D	14.72	MG/KG_DRYWT	D	30.54	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	0.449	MG/KG_DRYWT	DpJ
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.566	MG/KG_DRYWT	DU	0.389	MG/KG_DRYWT	DpJ	1.098	MG/KG_DRYWT	DpJ
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	0.99	MG/KG_DRYWT	DpJ
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.566	MG/KG_DRYWT	DU	0.558	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	370	MG/KG_DRYWT		540	MG/KG_DRYWT		1400	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	GG33-F07			HH22			II25		
Collection Date	11/20/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-GG33-00-06			S-07D-HH22-00-10			S-07D-II25-00-04		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	9.55	MG/KG_DRYWT	D	14.92	MG/KG_DRYWT	D	7.909	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	16.74	MG/KG_DRYWT	D	27.71	MG/KG_DRYWT	D	14.96	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	23.39	MG/KG_DRYWT	D	37.08	MG/KG_DRYWT	D	18.7	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	13.32	MG/KG_DRYWT	D	18.19	MG/KG_DRYWT	D	9.321	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	20.71	MG/KG_DRYWT	D	36.33	MG/KG_DRYWT	D	20.87	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	3.915	MG/KG_DRYWT	D	4.324	MG/KG_DRYWT	Dp	2.51	MG/KG_DRYWT	Dp
2,2',4,5,5'-Pentacb (PCB 101)	10.37	MG/KG_DRYWT	D	17.05	MG/KG_DRYWT	D	8.324	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	5.675	MG/KG_DRYWT	D	8.667	MG/KG_DRYWT	D	5.003	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	3.206	MG/KG_DRYWT	D	4.544	MG/KG_DRYWT	D	2.734	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	6.794	MG/KG_DRYWT	D	11.42	MG/KG_DRYWT	D	6.349	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.223	MG/KG_DRYWT	DU	0.57	MG/KG_DRYWT	DU	0.226	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	300	MG/KG_DRYWT		470	MG/KG_DRYWT		250	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	II36			KK32-F07			LL40		
Collection Date	11/20/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-II36-00-06			S-07D-KK32-00-09			S-07D-LL40-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	13.08	MG/KG_DRYWT	D	9.261	MG/KG_DRYWT	D	5.436	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	24.72	MG/KG_DRYWT	D	18.02	MG/KG_DRYWT	D	11.05	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	31.44	MG/KG_DRYWT	D	22.55	MG/KG_DRYWT	D	13.92	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	16.61	MG/KG_DRYWT	D	11.09	MG/KG_DRYWT	D	7.01	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	33.32	MG/KG_DRYWT	D	24.52	MG/KG_DRYWT	D	17.3	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	3.662	MG/KG_DRYWT	D	2.727	MG/KG_DRYWT	D	1.834	MG/KG_DRYWT	Dp
2,2',4,5,5'-Pentacb (PCB 101)	12.65	MG/KG_DRYWT	D	8.724	MG/KG_DRYWT	D	5.68	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	7.044	MG/KG_DRYWT	D	5.41	MG/KG_DRYWT	D	3.595	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	3.566	MG/KG_DRYWT	D	3.121	MG/KG_DRYWT	D	1.922	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	8.579	MG/KG_DRYWT	D	6.988	MG/KG_DRYWT	D	4.659	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.566	MG/KG_DRYWT	DU	0.228	MG/KG_DRYWT	DU	0.225	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	400	MG/KG_DRYWT		290	MG/KG_DRYWT		190	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	MM22			MM29			DD31-F07		
Collection Date	11/20/07			11/20/07			11/28/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-MM22-00-05			S-07D-MM29-00-09			S-07D-DD31-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	9.033	MG/KG_DRYWT	D	8.276	MG/KG_DRYWT	D	36.09	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	17.01	MG/KG_DRYWT	D	15.46	MG/KG_DRYWT	D	62.41	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	21.08	MG/KG_DRYWT	D	19.71	MG/KG_DRYWT	D	75.99	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	11.32	MG/KG_DRYWT	D	10.6	MG/KG_DRYWT	D	49.01	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	23.66	MG/KG_DRYWT	D	21.6	MG/KG_DRYWT	D	82.88	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	3.495	MG/KG_DRYWT	D	3.212	MG/KG_DRYWT	D	12	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	10.72	MG/KG_DRYWT	D	9.232	MG/KG_DRYWT	D	36	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	6.226	MG/KG_DRYWT	D	5.649	MG/KG_DRYWT	D	18.65	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	3.385	MG/KG_DRYWT	D	2.975	MG/KG_DRYWT	D	10.31	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	7.899	MG/KG_DRYWT	D	6.929	MG/KG_DRYWT	D	23.36	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	0.338	MG/KG_DRYWT	DpJ
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	0.566	MG/KG_DRYWT	DpJ
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.224	MG/KG_DRYWT	DU	0.224	MG/KG_DRYWT	DU	1.094	MG/KG_DRYWT	DU
Total MonoCB				0.178	MG/KG_DRYWT				
Total DiCB				27.37	MG/KG_DRYWT				
Total TriCB				100.3	MG/KG_DRYWT				
Total TetraCB				80.36	MG/KG_DRYWT				
Total PentaCB				53.05	MG/KG_DRYWT				
Total HexaCB				20.79	MG/KG_DRYWT				
Total HeptaCB				3.623	MG/KG_DRYWT				
Total OctaCB				0.626	MG/KG_DRYWT				
Total NonaCB				0.165	MG/KG_DRYWT				
DecaCB				0.036	MG/KG_DRYWT	D			
Total PCB Congeners (sum CONG x 2.6)	300	MG/KG_DRYWT		270	MG/KG_DRYWT		1100	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)				290	MG/KG_DRYWT				

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	DD36			DD36			EE41		
Collection Date	11/28/07			11/28/07			11/28/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			REP			SA		
Samp ID	S-07D-DD36-00-10			S-07D-DD36-00-11-REP			S-07D-EE41-00-14		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	36.63	MG/KG_DRYWT	D	32.96	MG/KG_DRYWT	D	22.38	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	63.81	MG/KG_DRYWT	D	59.38	MG/KG_DRYWT	D	38.17	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	72.16	MG/KG_DRYWT	D	66.81	MG/KG_DRYWT	D	41.14	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	44.59	MG/KG_DRYWT	D	42.34	MG/KG_DRYWT	D	25.14	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	96.04	MG/KG_DRYWT	D	91.74	MG/KG_DRYWT	D	58.93	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	28.35	MG/KG_DRYWT	Dp	3.446	MG/KG_DRYWT	Dp	3.531	MG/KG_DRYWT	Dp
2,2',4,5,5'-Pentacb (PCB 101)	21.97	MG/KG_DRYWT	D	20.6	MG/KG_DRYWT	D	12.91	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	10.65	MG/KG_DRYWT	D	9.237	MG/KG_DRYWT	D	6.952	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	8.77	MG/KG_DRYWT	D	8.174	MG/KG_DRYWT	D	6.082	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	17.27	MG/KG_DRYWT	D	15.92	MG/KG_DRYWT	D	11.51	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.095	MG/KG_DRYWT	DpJ	1.104	MG/KG_DRYWT	UJ	0.533	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.607	MG/KG_DRYWT	DpJ	0.439	MG/KG_DRYWT	DpJ	0.981	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	1.077	MG/KG_DRYWT	DU	1.104	MG/KG_DRYWT	DU	0.533	MG/KG_DRYWT	DU
Total MonoCB							0.395	MG/KG_DRYWT	
Total DiCB							67.17	MG/KG_DRYWT	
Total TriCB							219.4	MG/KG_DRYWT	
Total TetraCB							191.3	MG/KG_DRYWT	
Total PentaCB							98.41	MG/KG_DRYWT	
Total HexaCB							39.65	MG/KG_DRYWT	
Total HeptaCB							6.195	MG/KG_DRYWT	
Total OctaCB							1.014	MG/KG_DRYWT	
Total NonaCB							0.264	MG/KG_DRYWT	
DecaCB							0.051	MG/KG_DRYWT	D
Total PCB Congeners (sum CONG x 2.6)	1000	MG/KG_DRYWT		910	MG/KG_DRYWT		590	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)							620	MG/KG_DRYWT	

APPENDIX B

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	AA22			AA22-F07		
Collection Date	12/11/07			12/11/07		
Fraction	TOTAL			TOTAL		
QC Code	REP			SA		
Samp ID	S-07D-AA22-10-20-REP			S-07D-AA22-10-20		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	5.628	MG/KG_DRYWT	D	5	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	8.539	MG/KG_DRYWT	D	7.481	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	9.205	MG/KG_DRYWT	D	7.772	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	4.152	MG/KG_DRYWT	D	3.588	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	6.979	MG/KG_DRYWT	D	6.234	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.117	MG/KG_DRYWT	UJ	0.099	MG/KG_DRYWT	DJ
2,2',4,5,5'-Pentacb (PCB 101)	1.072	MG/KG_DRYWT	D	1.145	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	0.498	MG/KG_DRYWT	Dp	0.528	MG/KG_DRYWT	Dp
2,2',3,3',4,4'-Hexacb (PCB 128)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.272	MG/KG_DRYWT	D	0.26	MG/KG_DRYWT	Dp
2,2',4,4',5,5'-Hexacb (PCB 153)	0.736	MG/KG_DRYWT	D	0.722	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.117	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	DU
Total MonoCB						
Total DiCB						
Total TriCB						
Total TetraCB						
Total PentaCB						
Total HexaCB						
Total HeptaCB						
Total OctaCB						
Total NonaCB						
DecaCB						
Total PCB Congeners (sum CONG x 2.6)	96	MG/KG_DRYWT		85	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)						

APPENDIX B

2007 OU3 Pilot Cap Sediment PCB Analytical Results

Station ID	OU01			OU02			OU03			OU04		
Collection Date	9/18/07			9/18/07			9/18/07			9/18/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07B-OU01-00-03			S-07B-OU02-00-03			S-07B-OU03-00-03			S-07B-OU04-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.0051	MG/KG_DRYWT	D	0.017	MG/KG_DRYWT	D	0.015	MG/KG_DRYWT	D	0.075	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.0075	MG/KG_DRYWT	D	0.016	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D	0.063	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.021	MG/KG_DRYWT	D	0.04	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D	0.151	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.01	MG/KG_DRYWT	D	0.015	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D	0.036	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.02	MG/KG_DRYWT	D	0.033	MG/KG_DRYWT	D	0.027	MG/KG_DRYWT	D	0.115	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.013	MG/KG_DRYWT	D	0.021	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	D	0.073	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.017	MG/KG_DRYWT	D	0.028	MG/KG_DRYWT	D	0.021	MG/KG_DRYWT	D	0.083	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.0042	MG/KG_DRYWT	D	0.0078	MG/KG_DRYWT	D	0.0076	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	Dp
2,3',4,4',5'-Pentacb (PCB 118)	0.019	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D	0.025	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0021	MG/KG_DRYWT	D	0.003	MG/KG_DRYWT	D	0.0027	MG/KG_DRYWT	D	0.0051	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.015	MG/KG_DRYWT	D	0.024	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D	0.059	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.015	MG/KG_DRYWT	D	0.023	MG/KG_DRYWT	D	0.02	MG/KG_DRYWT	D	0.073	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.0011	MG/KG_DRYWT	Dp	0.0013	MG/KG_DRYWT	Dp	0.0007	MG/KG_DRYWT	Dp	0.001	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0016	MG/KG_DRYWT	Dp	0.0015	MG/KG_DRYWT	Dp	0.0016	MG/KG_DRYWT	Dp	0.001	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.00062	MG/KG_DRYWT	Dp	0.0001	MG/KG_DRYWT	DU	0.00054	MG/KG_DRYWT	Dp	0.001	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0005	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.0005	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0005	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.4	MG/KG_DRYWT		0.68	MG/KG_DRYWT		0.56	MG/KG_DRYWT		2.2	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 OU3 Pilot Cap Sediment PCB Analytical Results

Station ID	OU05			OU06			OU07			OU08		
Collection Date	9/18/07			9/18/07			9/18/07			9/18/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07B-OU05-00-03			S-07B-OU06-00-03			S-07B-OU07-00-03			S-07B-OU08-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.012	MG/KG_DRYWT	D	0.036	MG/KG_DRYWT	D	0.051	MG/KG_DRYWT	D	0.035	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.012	MG/KG_DRYWT	D	0.036	MG/KG_DRYWT	D	0.043	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.039	MG/KG_DRYWT	D	0.081	MG/KG_DRYWT	D	0.095	MG/KG_DRYWT	D	0.063	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.015	MG/KG_DRYWT	D	0.026	MG/KG_DRYWT	D	0.036	MG/KG_DRYWT	D	0.027	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.035	MG/KG_DRYWT	D	0.069	MG/KG_DRYWT	D	0.077	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.024	MG/KG_DRYWT	D	0.044	MG/KG_DRYWT	D	0.053	MG/KG_DRYWT	D	0.033	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.032	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	D	0.062	MG/KG_DRYWT	D	0.039	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.012	MG/KG_DRYWT	D	0.014	MG/KG_DRYWT	D	0.024	MG/KG_DRYWT	D	0.014	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	0.041	MG/KG_DRYWT	D	0.062	MG/KG_DRYWT	D	0.073	MG/KG_DRYWT	D	0.046	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0045	MG/KG_DRYWT	D	0.0005	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	D	0.0057	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.031	MG/KG_DRYWT	D	0.043	MG/KG_DRYWT	D	0.054	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.033	MG/KG_DRYWT	D	0.049	MG/KG_DRYWT	D	0.061	MG/KG_DRYWT	D	0.034	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.0024	MG/KG_DRYWT	Dp	0.0005	MG/KG_DRYWT	DU	0.0058	MG/KG_DRYWT	Dp	0.0031	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0031	MG/KG_DRYWT	Dp	0.0005	MG/KG_DRYWT	DU	0.0067	MG/KG_DRYWT	D	0.0039	MG/KG_DRYWT	D
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU	0.0042	MG/KG_DRYWT	Dp	0.0027	MG/KG_DRYWT	Dp
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU	0.001	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.77	MG/KG_DRYWT		1.3	MG/KG_DRYWT		1.7	MG/KG_DRYWT		1.1	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 OU3 Pilot Cap Sediment PCB Analytical Results

Station ID	OU09			OU10_07			OU11_07			OU12_07		
Collection Date	9/18/07			9/18/07			9/18/07			9/19/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07B-OU09-00-03			S-07B-OU10-00-03			S-07B-OU11-00-03			S-07B-OU12-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.075	MG/KG_DRYWT	D	0.15	MG/KG_DRYWT	D	0.0074	MG/KG_DRYWT	D	0.119	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.069	MG/KG_DRYWT	D	0.118	MG/KG_DRYWT	D	0.0063	MG/KG_DRYWT	D	0.095	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.124	MG/KG_DRYWT	D	0.224	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	D	0.186	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.037	MG/KG_DRYWT	D	0.049	MG/KG_DRYWT	D	0.005	MG/KG_DRYWT	D	0.059	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.098	MG/KG_DRYWT	D	0.151	MG/KG_DRYWT	D	0.015	MG/KG_DRYWT	D	0.126	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.047	MG/KG_DRYWT	D	0.087	MG/KG_DRYWT	D	0.0095	MG/KG_DRYWT	D	0.086	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.058	MG/KG_DRYWT	D	0.102	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D	0.088	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.016	MG/KG_DRYWT	D	0.023	MG/KG_DRYWT	Dp	0.0029	MG/KG_DRYWT	Dp	0.034	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	0.069	MG/KG_DRYWT	D	0.129	MG/KG_DRYWT	D	0.017	MG/KG_DRYWT	D	0.109	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0044	MG/KG_DRYWT	D	0.0031	MG/KG_DRYWT	D	0.00024	MG/KG_DRYWT	DJ	0.011	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.046	MG/KG_DRYWT	D	0.08	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D	0.07	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.042	MG/KG_DRYWT	D	0.084	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D	0.075	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.0031	MG/KG_DRYWT	Dp
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.0058	MG/KG_DRYWT	Dp
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.0017	MG/KG_DRYWT	DpJ
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0001	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DU	0.00098	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
Total MonoCB	0.006	MG/KG_DRYWT										
Total DiCB	0.104	MG/KG_DRYWT										
Total TriCB	0.342	MG/KG_DRYWT										
Total TetraCB	0.278	MG/KG_DRYWT										
Total PentaCB	0.261	MG/KG_DRYWT										
Total HexaCB	0.103	MG/KG_DRYWT										
Total HeptaCB	0.028	MG/KG_DRYWT	J									
Total OctaCB	0.02	MG/KG_DRYWT	U									
Total NonaCB	0.0059	MG/KG_DRYWT	U									
DecaCB	0.002	MG/KG_DRYWT	DU									
Total PCB Congeners (sum CONG x 2.6)	1.8	MG/KG_DRYWT		3.1	MG/KG_DRYWT		0.31	MG/KG_DRYWT		2.8	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)	1.1	MG/KG_DRYWT										

APPENDIX B

2007 OU3 Pilot Cap Sediment PCB Analytical Results

Station ID	OU13_07			OU13_07			OU14_07			OU15_07		
Collection Date	9/19/07			9/19/07			9/19/07			9/19/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	REP			SA			SA			SA		
Samp ID	S-07B-OU13-00-03-DUP			S-07B-OU13-00-03			S-07B-OU14-00-03			S-07B-OU15-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.099	MG/KG_DRYWT	D	0.167	MG/KG_DRYWT	D	0.086	MG/KG_DRYWT	D	0.174	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.068	MG/KG_DRYWT	D	0.129	MG/KG_DRYWT	D	0.069	MG/KG_DRYWT	D	0.141	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.123	MG/KG_DRYWT	D	0.208	MG/KG_DRYWT	D	0.135	MG/KG_DRYWT	D	0.216	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.017	MG/KG_DRYWT	D	0.04	MG/KG_DRYWT	D	0.045	MG/KG_DRYWT	D	0.081	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.064	MG/KG_DRYWT	D	0.118	MG/KG_DRYWT	D	0.091	MG/KG_DRYWT	D	0.16	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.035	MG/KG_DRYWT	D	0.06	MG/KG_DRYWT	D	0.053	MG/KG_DRYWT	D	0.081	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.024	MG/KG_DRYWT	D	0.048	MG/KG_DRYWT	D	0.053	MG/KG_DRYWT	D	0.078	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.0042	MG/KG_DRYWT	DpJ	0.007	MG/KG_DRYWT	Dp	0.016	MG/KG_DRYWT	D	0.028	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	0.037	MG/KG_DRYWT	D	0.065	MG/KG_DRYWT	D	0.061	MG/KG_DRYWT	D	0.089	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0043	MG/KG_DRYWT	D	0.0071	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.017	MG/KG_DRYWT	Dp	0.03	MG/KG_DRYWT	D	0.041	MG/KG_DRYWT	D	0.058	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.015	MG/KG_DRYWT	Dp	0.026	MG/KG_DRYWT	Dp	0.046	MG/KG_DRYWT	D	0.066	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0013	MG/KG_DRYWT	DpJ	0.0033	MG/KG_DRYWT	Dp
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0023	MG/KG_DRYWT	Dp	0.0047	MG/KG_DRYWT	Dp
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0019	MG/KG_DRYWT	DU	0.0011	MG/KG_DRYWT	DpJ
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0019	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0019	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0048	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DU	0.0019	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	1.3	MG/KG_DRYWT		2.3	MG/KG_DRYWT		1.8	MG/KG_DRYWT		3.1	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 OU3 Pilot Cap Sediment PCB Analytical Results

Station ID	OU16_07			OU17_07		
Collection Date	9/19/07			9/19/07		
Fraction	TOTAL			TOTAL		
QC Code	SA			SA		
Samp ID	S-07B-OU16-00-03			S-07B-OU17-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.273	MG/KG_DRYWT	D	0.0056	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.201	MG/KG_DRYWT	D	0.0061	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.349	MG/KG_DRYWT	D	0.014	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.08	MG/KG_DRYWT	D	0.0047	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.195	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.111	MG/KG_DRYWT	D	0.0073	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.092	MG/KG_DRYWT	D	0.0099	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.022	MG/KG_DRYWT	D	0.0025	MG/KG_DRYWT	Dp
2,3',4,4',5-Pentacb (PCB 118)	0.115	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.058	MG/KG_DRYWT	D	0.0088	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.052	MG/KG_DRYWT	D	0.0099	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.001	MG/KG_DRYWT	DU	0.0001	MG/KG_DRYWT	DU
Total MonoCB	0.027	MG/KG_DRYWT				
Total DiCB	0.368	MG/KG_DRYWT				
Total TriCB	0.976	MG/KG_DRYWT				
Total TetraCB	0.63	MG/KG_DRYWT				
Total PentaCB	0.441	MG/KG_DRYWT				
Total HexaCB	0.151	MG/KG_DRYWT				
Total HeptaCB	0.041	MG/KG_DRYWT	J			
Total OctaCB	0.05	MG/KG_DRYWT	U			
Total NonaCB	0.015	MG/KG_DRYWT	U			
DecaCB	0.005	MG/KG_DRYWT	DU			
Total PCB Congeners (sum CONG x 2.6)	4	MG/KG_DRYWT		0.24	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)	2.6	MG/KG_DRYWT				

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH1			BH1			BH1			BH2		
Collection Date	11/29/07			11/29/07			11/29/07			11/29/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-0BH1-00-10			S-07D-0BH1-10-20			S-07D-0BH1-20-25			S-07D-0BH2-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.212	MG/KG_DRYWT	D	0.087	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	DU	1.765	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	0.535	MG/KG_DRYWT	D	0.128	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	4.342	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	1.145	MG/KG_DRYWT	D	0.173	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	7.668	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.693	MG/KG_DRYWT	D	0.335	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	4.505	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	1.475	MG/KG_DRYWT	D	0.797	MG/KG_DRYWT	D	0.0026	MG/KG_DRYWT	Dp	5.922	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.773	MG/KG_DRYWT	D	0.174	MG/KG_DRYWT	D	0.00087	MG/KG_DRYWT	Dp	5.199	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.852	MG/KG_DRYWT	D	0.457	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	3.644	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.171	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	0.733	MG/KG_DRYWT	D	0.267	MG/KG_DRYWT	D	0.0025	MG/KG_DRYWT	Dp	3.153	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.061	MG/KG_DRYWT	D	0.0054	MG/KG_DRYWT	DpJ	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.432	MG/KG_DRYWT	D	0.18	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.115	MG/KG_DRYWT	DU
2,2',4,4',5,5'-Hexacb (PCB 153)	0.659	MG/KG_DRYWT	D	0.317	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	2.232	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.044	MG/KG_DRYWT	D	0.0028	MG/KG_DRYWT	DpJ	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.071	MG/KG_DRYWT	D	0.01	MG/KG_DRYWT	DpJ	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.052	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.01	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.01	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.01	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.114	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	21	MG/KG_DRYWT		7.8	MG/KG_DRYWT		0.016	MG/KG_DRYWT		100	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH2			BH2			BH3			BH3		
Collection Date	11/29/07			11/29/07			11/29/07			11/29/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			REP			SA		
Samp ID	S-07D-0BH2-10-20			S-07D-0BH2-20-30			S-07D-0BH3-00-10-REP			S-07D-0BH3-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	2.482	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.052	MG/KG_DRYWT	UJ	0.409	MG/KG_DRYWT	D
2,2',5'-Tricb (PCB 18)	5.41	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.052	MG/KG_DRYWT	UJ	0.65	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	10.67	MG/KG_DRYWT	D	0.193	MG/KG_DRYWT	Dp	2.494	MG/KG_DRYWT	D	1.475	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	6.622	MG/KG_DRYWT	D	0.334	MG/KG_DRYWT	D	1.676	MG/KG_DRYWT	D	0.829	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	10.2	MG/KG_DRYWT	D	0.904	MG/KG_DRYWT	D	2.774	MG/KG_DRYWT	D	1.645	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	9.769	MG/KG_DRYWT	D	0.258	MG/KG_DRYWT	D	1.8	MG/KG_DRYWT	D	0.727	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	13.51	MG/KG_DRYWT	D	0.921	MG/KG_DRYWT	D	2.295	MG/KG_DRYWT	D	1.052	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.226	MG/KG_DRYWT	DU	0.256	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.212	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	11.68	MG/KG_DRYWT	D	0.808	MG/KG_DRYWT	D	1.992	MG/KG_DRYWT	D	0.96	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.226	MG/KG_DRYWT	DU	0.15	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.104	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	5.467	MG/KG_DRYWT	D	0.722	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.6	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	8.997	MG/KG_DRYWT	D	0.859	MG/KG_DRYWT	Dp	1.571	MG/KG_DRYWT	D	0.859	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.226	MG/KG_DRYWT	DU	0.084	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.072	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.226	MG/KG_DRYWT	DU	0.145	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.106	MG/KG_DRYWT	D
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.226	MG/KG_DRYWT	DU	0.082	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	UJ	0.072	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.226	MG/KG_DRYWT	DU	0.057	MG/KG_DRYWT	Dp	0.052	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.226	MG/KG_DRYWT	DU	0.145	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.226	MG/KG_DRYWT	DU	0.12	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	220	MG/KG_DRYWT		16	MG/KG_DRYWT		38	MG/KG_DRYWT		25	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH3			BH3			BH3			BH3		
Collection Date	11/29/07			11/29/07			11/29/07			11/29/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	REP			SA			REP			SA		
Samp ID	S-07D-0BH3-10-20-REP			S-07D-0BH3-10-20			S-07D-0BH3-20-30-REP			S-07D-0BH3-20-30		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.014	MG/KG_DRYWT	Dp	0.001	MG/KG_DRYWT	D	0.00054	MG/KG_DRYWT	Dp	0.0015	MG/KG_DRYWT	Dp
2,2',5'-Tricb (PCB 18)	0.0028	MG/KG_DRYWT	D	0.0016	MG/KG_DRYWT	D	0.00037	MG/KG_DRYWT	D	0.0012	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.008	MG/KG_DRYWT	D	0.0026	MG/KG_DRYWT	D	0.0013	MG/KG_DRYWT	D	0.0014	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.0066	MG/KG_DRYWT	D	0.0019	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	UJ	0.0004	MG/KG_DRYWT	Dp
2,2',5,5'-Tetracb (PCB 52)	0.0097	MG/KG_DRYWT	D	0.0043	MG/KG_DRYWT	D	0.0028	MG/KG_DRYWT	Dp	0.0028	MG/KG_DRYWT	Dp
2,3',4,4'-Tetracb (PCB 66)	0.006	MG/KG_DRYWT	D	0.0022	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',4,5,5'-Pentacb (PCB 101)	0.0064	MG/KG_DRYWT	D	0.0017	MG/KG_DRYWT	D	0.00021	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	UJ
2,3,3',4,4'-Pentacb (PCB 105)	0.0012	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	UJ	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,3',4,4',5'-Pentacb (PCB 118)	0.009	MG/KG_DRYWT	D	0.0037	MG/KG_DRYWT	D	0.00099	MG/KG_DRYWT	D	0.0007	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.00033	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	UJ	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.004	MG/KG_DRYWT	D	0.0016	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',4,4',5,5'-Hexacb (PCB 153)	0.0062	MG/KG_DRYWT	D	0.0018	MG/KG_DRYWT	D	0.00059	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	UJ
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.00033	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	UJ	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.00048	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	UJ	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.00026	MG/KG_DRYWT	Dp	0.0002	MG/KG_DRYWT	UJ	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.2	MG/KG_DRYWT		0.058	MG/KG_DRYWT		0.018	MG/KG_DRYWT		0.021	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH6			BH6			BH6			BH7		
Collection Date	11/29/07			11/29/07			11/29/07			11/29/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-0BH6-00-10			S-07D-0BH6-10-20			S-07D-0BH6-20-30			S-07D-0BH7-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	5.299	MG/KG_DRYWT	D	0.221	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.509	MG/KG_DRYWT	Dp
2,2',5'-Tricb (PCB 18)	9.822	MG/KG_DRYWT	D	0.221	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.401	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	19.28	MG/KG_DRYWT	D	0.221	MG/KG_DRYWT	DU	0.0078	MG/KG_DRYWT	D	0.866	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	12.31	MG/KG_DRYWT	D	4.096	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D	0.561	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	19.94	MG/KG_DRYWT	D	11.23	MG/KG_DRYWT	D	0.025	MG/KG_DRYWT	D	1.153	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	7.558	MG/KG_DRYWT	D	3.254	MG/KG_DRYWT	D	0.02	MG/KG_DRYWT	Dp	0.414	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	6.118	MG/KG_DRYWT	D	9.067	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	Dp	0.777	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	1.35	MG/KG_DRYWT	D	0.221	MG/KG_DRYWT	DU	0.0086	MG/KG_DRYWT	D	0.19	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	5.055	MG/KG_DRYWT	D	7.461	MG/KG_DRYWT	D	0.033	MG/KG_DRYWT	D	0.701	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0037	MG/KG_DRYWT	D	0.102	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	3.079	MG/KG_DRYWT	D	3.958	MG/KG_DRYWT	D	0.016	MG/KG_DRYWT	D	0.54	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	4.347	MG/KG_DRYWT	D	6.839	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	D	0.722	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0016	MG/KG_DRYWT	D	0.058	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.002	MG/KG_DRYWT	Dp	0.088	MG/KG_DRYWT	D
2,2',3,4',5,5',6'-Heptacb (PCB 187)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0028	MG/KG_DRYWT	Dp	0.053	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0038	MG/KG_DRYWT	Dp	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0091	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D
Decacb - Congener (PCB 209)	0.11	MG/KG_DRYWT	DU	0.221	MG/KG_DRYWT	DU	0.0095	MG/KG_DRYWT	D	0.005	MG/KG_DRYWT	DpJ
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	250	MG/KG_DRYWT		120	MG/KG_DRYWT		0.5	MG/KG_DRYWT		19	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH7			BH7			BH10			BH10		
Collection Date	11/29/07			11/29/07			11/29/07			11/29/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-0BH7-10-20			S-07D-0BH7-20-30			S-07D-BH10-00-10			S-07D-BH10-10-20		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.002	MG/KG_DRYWT	Dp	0.00019	MG/KG_DRYWT	DU	0.419	MG/KG_DRYWT	Dp	0.011	MG/KG_DRYWT	DU
2,2',5'-Tricb (PCB 18)	0.0048	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.569	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU
2,4,4'-Tricb (PCB 28)	0.0082	MG/KG_DRYWT	D	0.00082	MG/KG_DRYWT	Dp	1.223	MG/KG_DRYWT	D	0.035	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.0062	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.847	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.016	MG/KG_DRYWT	D	0.0025	MG/KG_DRYWT	D	1.91	MG/KG_DRYWT	D	0.053	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.0054	MG/KG_DRYWT	D	0.0004	MG/KG_DRYWT	Dp	0.749	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.011	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	1.856	MG/KG_DRYWT	D	0.061	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.003	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.273	MG/KG_DRYWT	D	0.00088	MG/KG_DRYWT	DpJ
2,3',4,4',5'-Pentacb (PCB 118)	0.012	MG/KG_DRYWT	D	0.00084	MG/KG_DRYWT	Dp	1.67	MG/KG_DRYWT	D	0.061	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0019	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.165	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.009	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.842	MG/KG_DRYWT	D	0.029	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.012	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	1.23	MG/KG_DRYWT	D	0.041	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.00086	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.096	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0014	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.152	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.00071	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.1	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0004	MG/KG_DRYWT	Dp	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.0009	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.00089	MG/KG_DRYWT	Dp	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.25	MG/KG_DRYWT		0.012	MG/KG_DRYWT		32	MG/KG_DRYWT		0.82	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH10			BH4			BH4			BH4		
Collection Date	11/29/07			11/30/07			11/30/07			11/30/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-BH10-20-28			S-07D-0BH4-00-10			S-07D-0BH4-10-20			S-07D-0BH4-20-30		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.002	MG/KG_DRYWT	Dp	0.214	MG/KG_DRYWT	D	0.071	MG/KG_DRYWT	D	0.031	MG/KG_DRYWT	Dp
2,2',5'-Tricb (PCB 18)	0.0014	MG/KG_DRYWT	D	0.474	MG/KG_DRYWT	D	0.196	MG/KG_DRYWT	D	0.076	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.0018	MG/KG_DRYWT	D	1.076	MG/KG_DRYWT	D	0.37	MG/KG_DRYWT	D	0.214	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.00053	MG/KG_DRYWT	Dp	0.756	MG/KG_DRYWT	D	0.234	MG/KG_DRYWT	D	0.121	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.0024	MG/KG_DRYWT	Dp	1.103	MG/KG_DRYWT	D	0.328	MG/KG_DRYWT	D	0.159	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.00019	MG/KG_DRYWT	DU	0.927	MG/KG_DRYWT	D	0.223	MG/KG_DRYWT	D	0.171	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.00019	MG/KG_DRYWT	DU	1.655	MG/KG_DRYWT	D	0.311	MG/KG_DRYWT	D	0.24	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.00019	MG/KG_DRYWT	DU	0.575	MG/KG_DRYWT	D	0.078	MG/KG_DRYWT	D	0.055	MG/KG_DRYWT	D
2,3',4,4',5'-Pentacb (PCB 118)	0.0007	MG/KG_DRYWT	Dp	1.647	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	D	0.198	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.00019	MG/KG_DRYWT	DU	0.281	MG/KG_DRYWT	D	0.023	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.00019	MG/KG_DRYWT	DU	1.469	MG/KG_DRYWT	D	0.184	MG/KG_DRYWT	D	0.153	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.00019	MG/KG_DRYWT	DU	1.657	MG/KG_DRYWT	Dp	0.212	MG/KG_DRYWT	Dp	0.19	MG/KG_DRYWT	Dp
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.00019	MG/KG_DRYWT	DU	0.151	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.00019	MG/KG_DRYWT	DU	0.184	MG/KG_DRYWT	D	0.0023	MG/KG_DRYWT	DpJ	0.00053	MG/KG_DRYWT	DpJ
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.00019	MG/KG_DRYWT	DU	0.073	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.023	MG/KG_DRYWT		32	MG/KG_DRYWT		6.4	MG/KG_DRYWT		4.2	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 Boat House Sediment PCB Analytical Results

Station ID	BH5			BH5			BH5			BH8		
Collection Date	11/30/07			11/30/07			11/30/07			11/30/07		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-0BH5-00-10			S-07D-0BH5-10-20			S-07D-0BH5-20-30			S-07D-0BH8-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.458	MG/KG_DRYWT	D	0.0048	MG/KG_DRYWT	D	0.00076	MG/KG_DRYWT	Dp	0.01	MG/KG_DRYWT	DU
2,2',5'-Tricb (PCB 18)	0.778	MG/KG_DRYWT	D	0.0098	MG/KG_DRYWT	D	0.0011	MG/KG_DRYWT	D	0.02	MG/KG_DRYWT	Dp
2,4,4'-Tricb (PCB 28)	1.248	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D	0.0021	MG/KG_DRYWT	D	0.091	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.936	MG/KG_DRYWT	D	0.012	MG/KG_DRYWT	D	0.0011	MG/KG_DRYWT	D	0.057	MG/KG_DRYWT	Dp
2,2',5,5'-Tetracb (PCB 52)	2.041	MG/KG_DRYWT	D	0.021	MG/KG_DRYWT	D	0.0035	MG/KG_DRYWT	Dp	0.121	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.825	MG/KG_DRYWT	D	0.014	MG/KG_DRYWT	D	0.0024	MG/KG_DRYWT	Dp	0.083	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	1.59	MG/KG_DRYWT	D	0.016	MG/KG_DRYWT	D	0.00087	MG/KG_DRYWT	D	0.056	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.228	MG/KG_DRYWT	D	0.004	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.013	MG/KG_DRYWT	Dp
2,3',4,4',5'-Pentacb (PCB 118)	1.091	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D	0.0021	MG/KG_DRYWT	D	0.057	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.121	MG/KG_DRYWT	D	0.0016	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.652	MG/KG_DRYWT	D	0.0099	MG/KG_DRYWT	D	0.00051	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.95	MG/KG_DRYWT	D	0.015	MG/KG_DRYWT	D	0.00084	MG/KG_DRYWT	D	0.035	MG/KG_DRYWT	D
2,2',3,3',4,4',5'-Heptacb (PCB 170)	0.117	MG/KG_DRYWT	D	0.0011	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.133	MG/KG_DRYWT	D	0.0016	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.075	MG/KG_DRYWT	D	0.001	MG/KG_DRYWT	D	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0068	MG/KG_DRYWT	DpJ	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.012	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU
Total MonoCB										0.042	MG/KG_DRYWT	U
Total DiCB										0.038	MG/KG_DRYWT	J
Total TriCB										0.405	MG/KG_DRYWT	
Total TetraCB										0.827	MG/KG_DRYWT	
Total PentaCB										0.669	MG/KG_DRYWT	
Total HexaCB										0.222	MG/KG_DRYWT	J
Total HeptaCB										0.048	MG/KG_DRYWT	J
Total OctaCB										0.209	MG/KG_DRYWT	U
Total NonaCB										0.063	MG/KG_DRYWT	U
DecaCB										0.021	MG/KG_DRYWT	DU
Total PCB Congeners (sum CONG x 2.6)	29	MG/KG_DRYWT		0.38	MG/KG_DRYWT		0.04	MG/KG_DRYWT		1.5	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)										2.2	MG/KG_DRYWT	

Qualifiers:

D	Result from dilution run. Result from initial run outside linear range of instrument
J	Result is estimated. Analyte detected below the sample specific reporting limit
U	Analyte not detected at the sample specific reporting limit
p	Relative percent difference (RPD) between values obtained from the dual columns is >40%

Appendix C

VOC Analytical Data

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APPENDIX C

2007 Post-Dredge Sediment VOC Analytical Results

Station ID	AA22-F07			AA22					
Collection Date	12/11/07			12/11/07			12/11/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			REP			TB		
Samp ID	S-07D-AA22-02-03			S-07D-AA22-02-03-REP			Trip Blank		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Acetone	0.155	MG/KG_DRYWT	UJ	0.265	MG/KG_DRYWT	U	0.028	MG/KG_DRYWT	
Benzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Bromobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Bromodichloromethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Bromoform	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Bromomethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Carbon Disulfide	0.014	MG/KG_DRYWT		0.021	MG/KG_DRYWT		0.002	MG/KG_DRYWT	U
Carbon Tetrachloride	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Chlorobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Chloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Chloroform	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Chloromethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Cis-1,2-Dichloroethene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Cis-1,3-Dichloropropene	0.0035	MG/KG_DRYWT	R	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Dibromochloromethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Dibromomethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Dichlorodifluoromethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Ethylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Hexachlorobutadiene	0.0035	MG/KG_DRYWT	R	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Isopropylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Methylene Chloride	0.0088	MG/KG_DRYWT	UJ	0.0094	MG/KG_DRYWT	U	0.0015	MG/KG_DRYWT	j
Methyl-Tert-Butyl-Ether (Mtbe)	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Naphthalene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
N-Butylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
N-Propylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
O-Xylene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
P-Isopropyltoluene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
P/M Xylene	0.007	MG/KG_DRYWT	UJ	0.0075	MG/KG_DRYWT	U	0.004	MG/KG_DRYWT	U
Sec-Butylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Styrene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Tert-Butylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Tetrachloroethene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Toluene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Trans-1,2-Dichloroethene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Trans-1,3-Dichloropropene	0.0035	MG/KG_DRYWT	R	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Trichloroethene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Trichlorofluoromethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U

APPENDIX C

2007 Post-Dredge Sediment VOC Analytical Results

Station ID	AA22-F07			AA22					
Collection Date	12/11/07			12/11/07			12/11/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			REP			TB		
Samp ID	S-07D-AA22-02-03			S-07D-AA22-02-03-REP			Trip Blank		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Vinyl Acetate	0.0035	MG/KG_DRYWT	R	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
Vinyl Chloride	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1-Dichloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1-Dichloroethene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1-Dichloropropene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1,1-Trichloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1,1,2-Tetrachloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1,2-Trichloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,1,2,2-Tetrachloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2-Dibromoethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2-Dibromo-3-Chloropropane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2-Dichlorobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2-Dichloroethane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2-Dichloropropane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2,3-Trichlorobenzene	0.0035	MG/KG_DRYWT	R	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2,3-Trichloropropane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,2,4-Trichlorobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	UJ	0.002	MG/KG_DRYWT	U
1,2,4-Trimethylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,3-Dichlorobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,3-Dichloropropane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,3,5-Trimethylbenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
1,4-Dichlorobenzene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
2-Butanone	0.029	MG/KG_DRYWT		0.051	MG/KG_DRYWT		0.002	MG/KG_DRYWT	U
2-Chloroethyl Vinyl Ether	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
2-Chlorotoluene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
2-Hexanone	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
2,2-Dichloropropane	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
4-Chlorotoluene	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U
4-Methyl-2-Pentanone	0.0035	MG/KG_DRYWT	UJ	0.0038	MG/KG_DRYWT	U	0.002	MG/KG_DRYWT	U

Qualifiers:

J	Result is estimated
R	Result is rejected
U	Analyte not detected at the sample specific reporting limit

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Appendix D

Grain Size and Total Organic Carbon Analytical Data

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APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	N14-F07			I1			I4-F07		
Collection Date	11/5/07			11/6/07			11/6/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-0N14-00-05			S-07D-00I1-00-05			S-07D-00I4-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	24.29	PCT		29.35	PCT		30.66	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	53.83	PCT		58.42	PCT		48.22	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	21.88	PCT		12.23	PCT		21.12	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT		0	PCT	
Total Organic Carbon (TOC)	8.28	PCT		9.49	PCT		7.55	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	K2			N4-F07			O1		
Collection Date	11/6/07			11/6/07			11/6/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-00K2-00-08			S-07D-00N4-00-06			S-07D-00O1-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	21.75	PCT		20.63	PCT		26.51	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	35.86	PCT		58.39	PCT		40.24	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	42.39	PCT		20.98	PCT		33.25	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT		0	PCT	
Total Organic Carbon (TOC)	5.2	PCT		6.71	PCT		10.02	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	Q9			J14			K5		
Collection Date	11/6/07			11/6/07			11/8/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-00Q9-00-05			S-07D-0J14-00-06			S-07D-00K5-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	30.05	PCT		24.94	PCT		23.93	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	57.52	PCT		62.11	PCT		47.93	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	12.43	PCT		12.95	PCT		27.51	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT		0.63	PCT	
Total Organic Carbon (TOC)	7.61	PCT		7.99	PCT		8.21	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	J10			J10			K21		
Collection Date	11/8/07			11/8/07			11/8/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	REP			SA			SA		
Samp ID	S-07D-0J10-00-07-REP			S-07D-0J10-00-07			S-07D-0K21-00-12		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	26.04	PCT		22.31	PCT		25.82	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	61.14	PCT		55.13	PCT		47.53	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	11.16	PCT		22.56	PCT		26.65	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	1.66	PCT		0	PCT		0	PCT	
Total Organic Carbon (TOC)	11.02	PCT		8.65	PCT		3.9	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	M17			WW24			WW41		
Collection Date	11/8/07			11/14/07			11/14/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-0M17-00-06			S-07D-WW24-00-08			S-07D-WW41-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	26.28	PCT		31.25	PCT		12.82	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	57.62	PCT		38.45	PCT		20.67	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	16.1	PCT		30.2	PCT		63.14	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0.1	PCT		3.37	PCT	
Total Organic Carbon (TOC)	7.74	PCT		4.97	PCT		2.64	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	YY32			BBB23			OO26		
Collection Date	11/14/07			11/16/07			11/16/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-YY32-00-02			S-07D-BBB23-00-09			S-07D-OO26-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	14.46	PCT		2.89	PCT		35.79	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	15.98	PCT		4.17	PCT		46.42	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	66.82	PCT		86.07	PCT		15.59	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	2.74	PCT		6.87	PCT		2.2	PCT	
Total Organic Carbon (TOC)	1.56	PCT		0.57	PCT		6.04	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	OO32			OO38			SS29		
Collection Date	11/16/07			11/16/07			11/16/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-OO32-00-08			S-07D-OO38-00-05			S-07D-SS29-00-07		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	31.58	PCT		39.52	PCT		33.42	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	51.73	PCT		47.64	PCT		46.75	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	11.56	PCT		12.84	PCT		18.46	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	5.13	PCT		0	PCT		1.37	PCT	
Total Organic Carbon (TOC)	5.47	PCT		4.5	PCT		5.4	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	VV34			DD22			GG29		
Collection Date	11/16/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-VV34-00-10			S-07D-DD22-00-11			S-07D-GG29-00-06		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	37.06	PCT		32.77	PCT		34.42	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	45.99	PCT		59.36	PCT		48.65	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	16.95	PCT		7.87	PCT		16.93	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT		0	PCT	
Total Organic Carbon (TOC)	6.38	PCT		8.7	PCT		10.64	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	GG33-F07			HH22			II25		
Collection Date	11/20/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-GG33-00-06			S-07D-HH22-00-10			S-07D-II25-00-04		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	37.29	PCT		36.64	PCT		35.84	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	49.46	PCT		59.61	PCT		47.22	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	13.04	PCT		3.66	PCT		14.16	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0.21	PCT		0.09	PCT		2.78	PCT	
Total Organic Carbon (TOC)	5.45	PCT		6.81	PCT		5.44	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	II36			KK32-F07			LL40		
Collection Date	11/20/07			11/20/07			11/20/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-II36-00-06			S-07D-KK32-00-09			S-07D-LL40-00-03		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	34.73	PCT		36.32	PCT		27.07	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	58.26	PCT		58.72	PCT		56.41	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	7.01	PCT		4.96	PCT		15.07	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT		1.45	PCT	
Total Organic Carbon (TOC)	6.95	PCT		6.07	PCT		4.53	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	MM22			MM29			DD31-F07		
Collection Date	11/20/07			11/20/07			11/28/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA		
Samp ID	S-07D-MM22-00-05			S-07D-MM29-00-09			S-07D-DD31-00-10		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	37	PCT		35.46	PCT		35.86	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	59.25	PCT		55.43	PCT		56.84	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	3.75	PCT		7.88	PCT		4.95	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		1.23	PCT		2.35	PCT	
Total Organic Carbon (TOC)	6.19	PCT		6.08	PCT		11.36	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	DD36			DD36			EE41		
Collection Date	11/28/07			11/28/07			11/28/07		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	SA			REP			SA		
Samp ID	S-07D-DD36-00-10			S-07D-DD36-00-11-REP			S-07D-EE41-00-14		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	36.04	PCT		34.05	PCT		40.24	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	59.14	PCT		61.67	PCT		54.23	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	4.82	PCT		3.65	PCT		5.53	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0.63	PCT		0	PCT	
Total Organic Carbon (TOC)	12.5	PCT		11.6	PCT		11.47	PCT	

APPENDIX D

2007 Post-Dredge Sediment PCB Analytical Results

Station ID	AA22			AA22-F07		
Collection Date	12/11/07			12/11/07		
Fraction	TOTAL			TOTAL		
QC Code	REP			SA		
Samp ID	S-07D-AA22-10-20-REP			S-07D-AA22-10-20		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ
Ratio of clay to total sample wt (FRAC_CLAY).	25.4	PCT		26.77	PCT	
Ratio of silt to total sample wt (FRAC_SILT)	60.4	PCT		60.07	PCT	
Ratio of sand to total sample wt (FRAC_SAND)	14.2	PCT		13.16	PCT	
Ratio of gravel to total sample wt (FRAC_GRAV)	0	PCT		0	PCT	
Total Organic Carbon (TOC)	14.64	PCT		14.89	PCT	



US ARMY CORPS
OF ENGINEERS
New England District

Contract No. DACW33-03-D-0004

Delivery Order No. 22

June 2008

FINAL
**Water Quality Monitoring
Summary Report**
2007 Remedial Dredging



**Environmental Monitoring, Sampling, and
Analysis**

**New Bedford Harbor Superfund Site
New Bedford Harbor, MA**

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Submitted to:

Department of the Army
U.S. Army Corps of Engineers
North Atlantic Division
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Prepared by:

Battelle
397 Washington Street
Duxbury, MA 02332
(781) 934-0571

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EXECUTIVE SUMMARY

Remediation dredging was performed in New Bedford Harbor from August 6th through October 9th 2007. Dredge activities occurred primarily in two areas: ‘Area G’ encompassing sections of DMU-1 and DMU-102, and ‘Area H’ encompassing sections of DMU-9 and DMU-10, and DMU-11. The primary objective of the water quality monitoring program is to conduct boat-based monitoring to provide field reconnaissance information to the United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (USEPA), and dredging operators, to gauge the extent of potential water quality impacts that may result from dredging operations. These data are used to guide project operations as necessary to minimize environmental impacts, limit potential recontamination of previously dredged areas, and ensure that the dredging activities are conducted in a manner which does not hinder the seasonal migration of anadromous fish to and from the Acushnet River.

Water quality monitoring started on August 6, 2007 prior to the dredge operations to establish background levels, and ended October 9, 2007, approximately two weeks after dredging stopped. Monitoring activities utilized YSI sondes to collect instantaneous real time data from the monitoring vessel. Additional YSI sondes were deployed on moorings to collect longer term data. Each YSI was equipped to measure turbidity, salinity, temperature, depth and dissolved oxygen. The project criterion, termed as a “reportable event”, is defined as 50 Nephelometric Turbidity Units (NTU) above background measured 600 feet (ft) downstream of the dredging and associated activities. A warning level is defined as an exceedance of 50 NTU above background at 300 ft downstream of the dredging and associated activities. If the warning level was exceeded, the USACE was to be contacted immediately to determine what, if any, operational modifications might be warranted to abate the condition and to reduce the potential for a criteria exceedance at the 600-foot transect. Neither the warning level nor the project criterion was exceeded at any time during the 2007 monitoring.

Water samples were collected for turbidity and total suspended solids (TSS) analyses on six occasions during the dredge program. Samples from three of these events were also collected for polychlorinated biphenyls (PCB) and toxicity testing. Metals samples were collected during four of the sampling events and were archived for potential analysis. Samples were collected either to establish baseline conditions and/or re-establish relationships between field measurements (i.e. turbidity) and toxicity results to verify the protectiveness of the 50 NTU criteria. No samples were collected in response to an exceedance of the 50 NTU turbidity criteria. Data collected confirmed that the 50 NTU criterion continues to be ecologically protective, while still allowing remediation efforts to progress.

The deployment of the continuously recording water quality sensors (YSI sondes) provided additional information to compliment the adaptive monitoring approach discussed above. The location of sensors both north and south of the dredge areas provided information about tidal influences on sediment suspension and transport. Continuous readings provided water quality data for periods when adaptive boat-based sampling was not underway. This included inactive dredge periods such as nights and weekends, which provided a reasonable background condition for comparison.



As expected, turbidity correlated well with TSS ($R^2 = 0.9367$) in the two dredging areas. Samples collected from Area G showed higher correlation between total PCB with TSS and thus with turbidity than the samples from Area H. Dissolved PCB concentrations were generally low in both areas and did not correlate well with TSS.



1.0 INTRODUCTION

1.1 Site Description

The New Bedford Harbor Superfund Site (Site), located in Bristol County, Massachusetts (MA), extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into 17,000 adjacent acres of Buzzards Bay (Figure 1). Industrial and urban development surrounding the harbor has resulted in sediments becoming contaminated with high concentrations of many pollutants, notably polychlorinated biphenyls (PCBs) and heavy metals. Two manufacturers in the area used PCBs while producing electronic devices from 1940 to the late 1970s, when the use of PCBs was banned by the U.S. Environmental Protection Agency (USEPA). Based on human health concerns and ecological risk assessments, USEPA added New Bedford Harbor to the National Priorities List in 1983 as a designated Superfund Site. Through an Interagency Agreement between the USEPA and the U.S. Army Corps of Engineers, New England District (USACE NAE), the USACE is responsible for carrying out the design and implementation of the remedial measures at the site. The Site has been divided into three areas – the upper, lower and outer harbors – consistent with geographical features of the area and gradients of contamination (Figure 2). All of the 2007 activities conducted under the Water Quality Monitoring occurred in the upper Harbor.

Aerovox Inc. in New Bedford, MA used PCBs in the manufacture of electrical capacitors from approximately 1940 to 1977. This facility is located in the upper harbor and is considered one of the major sources of historic PCB contamination to New Bedford Harbor. The highest concentrations of PCBs were found in sediments in a 5-acre area in the northern portion of the Acushnet River Estuary adjacent to the Aerovox facility. These ‘hot spot’ sediments, which contained PCBs upwards of 100,000 milligrams per kilogram (mg/kg), were removed between 1994 and 1995 as part of USEPA’s 1990 “Hot Spot” Record of Decision (ROD). Full scale remediation dredging per the 1998 Upper and Lower Harbor ROD was initiated in 2004 and continued in 2005, 2006, and 2007. Another known source of PCB contamination in New Bedford Harbor is related to activities at the Cornell-Dubilier mill on the western shore of the outer harbor. In 2005, a 15 acre underwater cap pilot project (Figure 2) was implemented near Cornell-Dubilier to cap PCB contaminated sediments.

The Site is divided into a series of Dredge Management Units (DMU) based on contamination levels, contamination sources, topography, and other factors. In 2007, dredge activities were conducted at two areas: ‘Area G’ encompassing sections of DMU-1 and DMU-102 and ‘Area H’ encompassing sections of DMU-9 and DMU-10, and DMU-11 (Figure 3).

The remediation of this Site per the 1998 ROD involves the excavation and dredging of approximately 880,000 cubic yards of PCB contaminated sediment. The majority of contaminated material is being removed utilizing a hydraulic dredge that pumps dredge slurry to the project’s Sawyer Street facility where it is mechanically processed to remove all sand, gravel, and debris material. The silt and clay size materials are then pumped to the Area D Dewatering Facility located on Herman Melville Boulevard where it is mechanically dewatered and transported off-site for disposal.

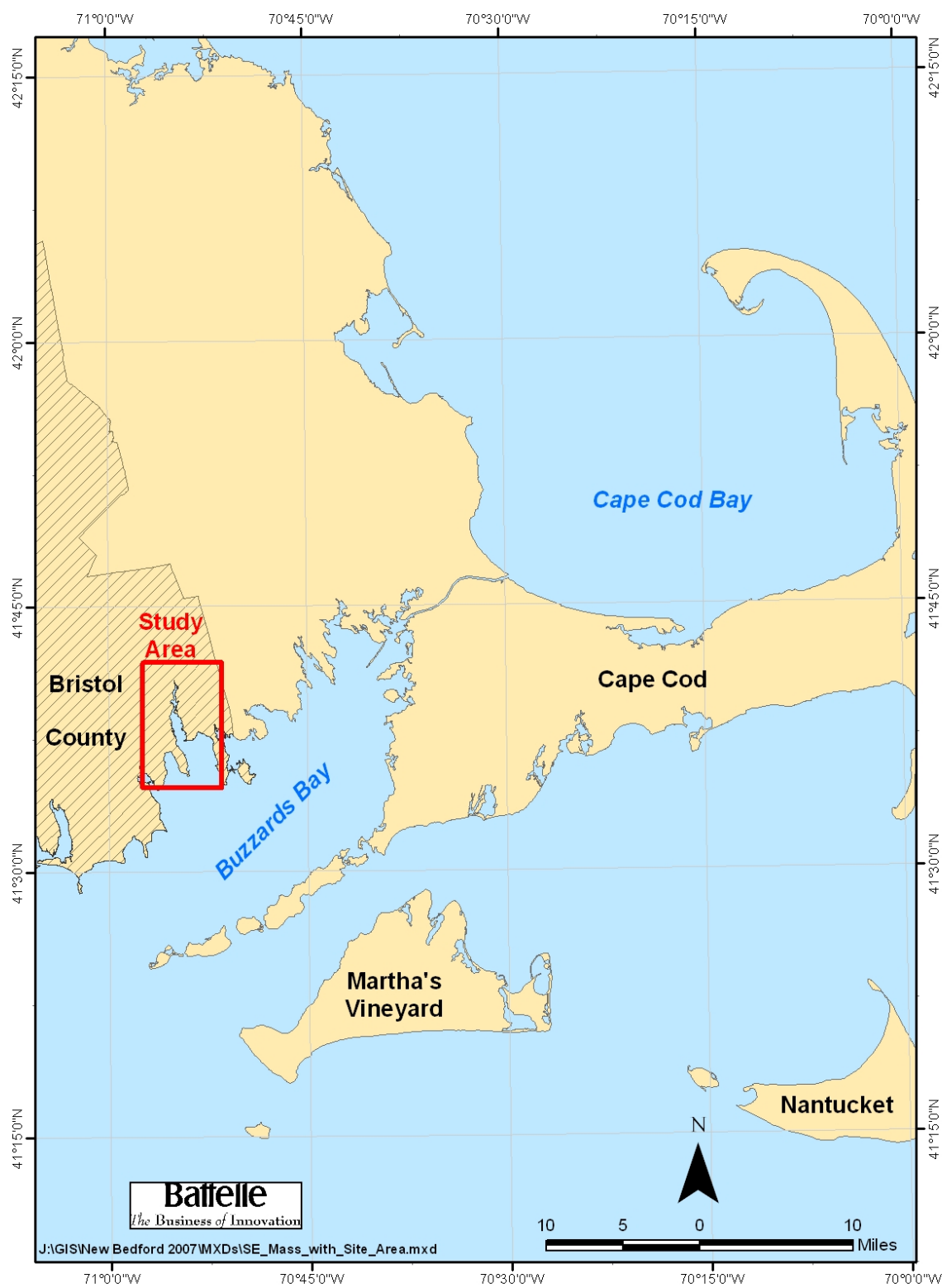


Figure 1. Location of the Site in Southeastern MA.

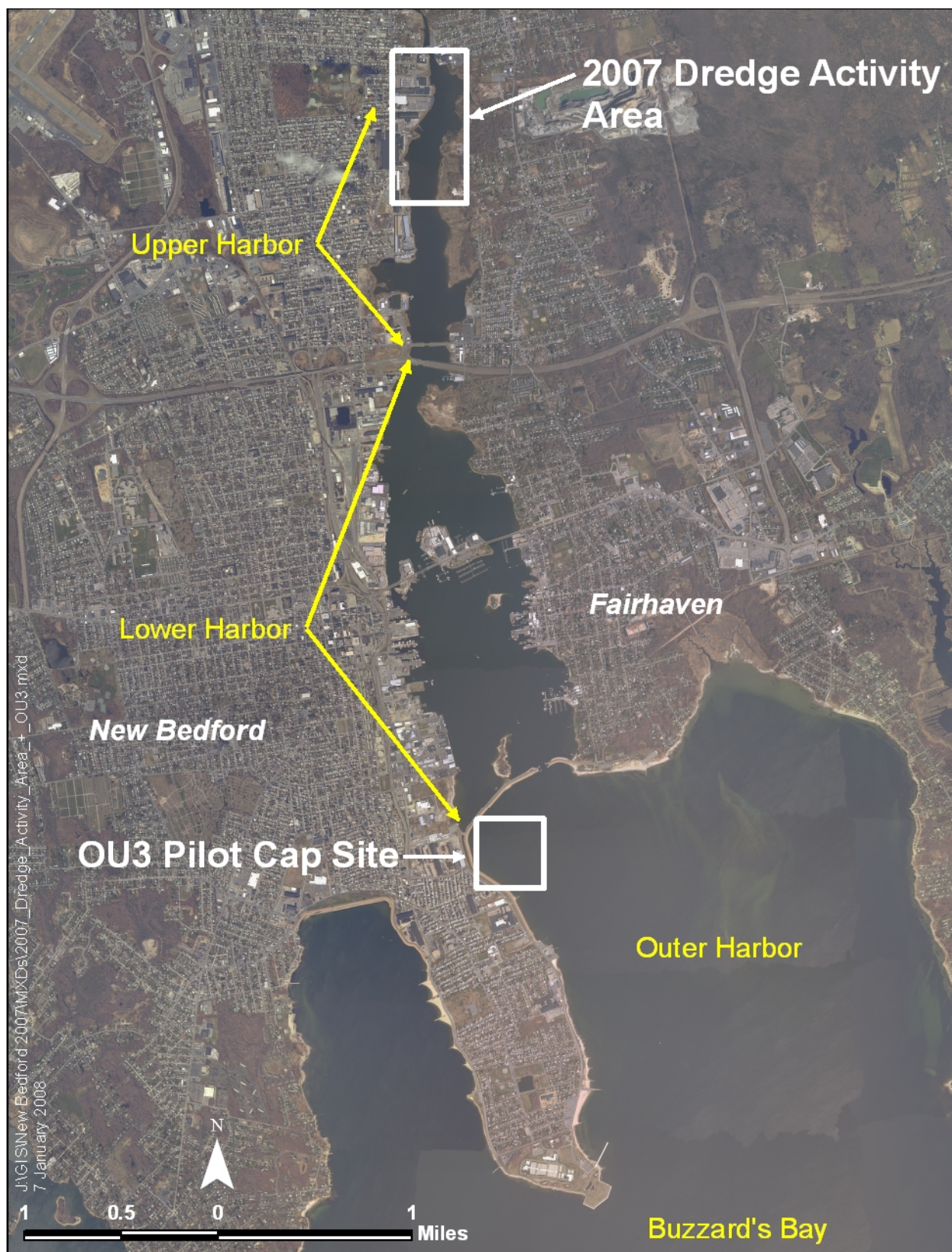


Figure 2. Location of the 2007 Dredge Activity Area within New Bedford Harbor.

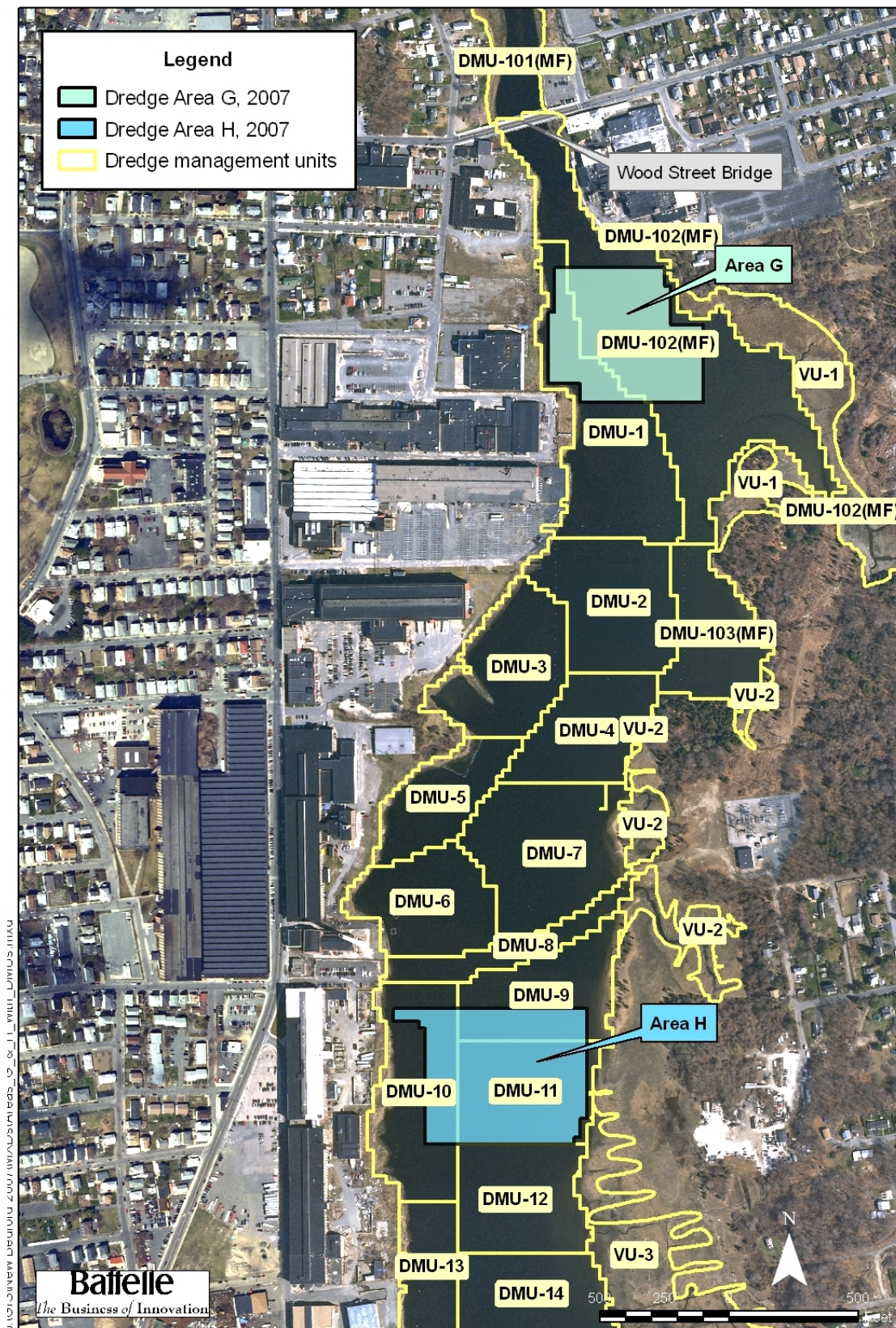


Figure 3. 2007 Dredge Areas



1.2 Project Objectives

The resuspension of sediments during dredging, and dredging related activities, can transport contaminated sediments away from the dredge area. Additionally, contaminated sediments suspended in the water column present a concern for potential toxicity to aquatic organisms in the project area. The primary objective of the 2007 monitoring effort was to conduct boat-based field monitoring to provide field reconnaissance information to the USACE, USEPA and dredging operators, to gauge the extent of water quality impacts resulting from dredging operations. This information may be used to make operational adjustments as needed to limit the dispersal of suspended sediments and their associated contaminants as well as limit the extent of biological impacts to the water column. An additional objective was to ensure that the dredging activities were conducted in a manner which did not hinder the seasonal migration of anadromous fish in the Acushnet River (i.e. fish are able to successfully navigate past dredging operations).

The project criterion, termed as a “reportable event”, is defined as 50 Nephelometric Turbidity Units (NTU) above background measured 600 feet (ft) downstream of the dredging and associated activities. A warning level is defined as an exceedance of 50 NTU above background at 300 ft downstream of the dredging and associated activities. If the warning criteria was exceeded, the USACE was to be contacted immediately to determine what, if any, operational modifications may be warranted to abate the condition and to reduce the potential for a criteria exceedance at the 600-ft transect.

1.3 Water Quality Monitoring Program

The focus of the 2007 water quality monitoring program was on near-field water column impacts as well as assessment of the extent of sediment resuspension and transport away from the dredging operation. These data are used to guide project operations as necessary to minimize environmental impacts, limit potential recontamination of previously dredged areas, ensure that the dredging activities are conducted in a manner which does not hinder the seasonal migration of anadromous fish to and from the Acushnet River, and to determine the degree and extent of sediment plumes advecting away from the Site during dredging operations. To meet this objective, a tiered monitoring approach was employed which incorporated field measurements of turbidity and water quality parameters and water sampling for toxicity testing and laboratory analysis on a periodic basis as needed. Water column measurements were conducted along four transects for each of the dredge areas described below and illustrated in Figure 4. As dredging operations moved throughout the dredge areas, the monitoring locations moved relative to those activities as follows:

- **Reference:** A reference station 1,000 ft up-current of dredging operations to provide background conditions. A reference station was identified for each of the two dredge areas for both ebb and flood tide conditions.
- **Dredge Boundary:** Measurements were made at the edge of the dredge area. This is defined as a down-current location as close as practicable and as safety allows.
- **300 ft Downstream:** Defined as a transect set, 300 ft down-current from the dredging operation.
- **600 ft Downstream:** Defined as a transect set, 600 ft down-current from the dredging operation.

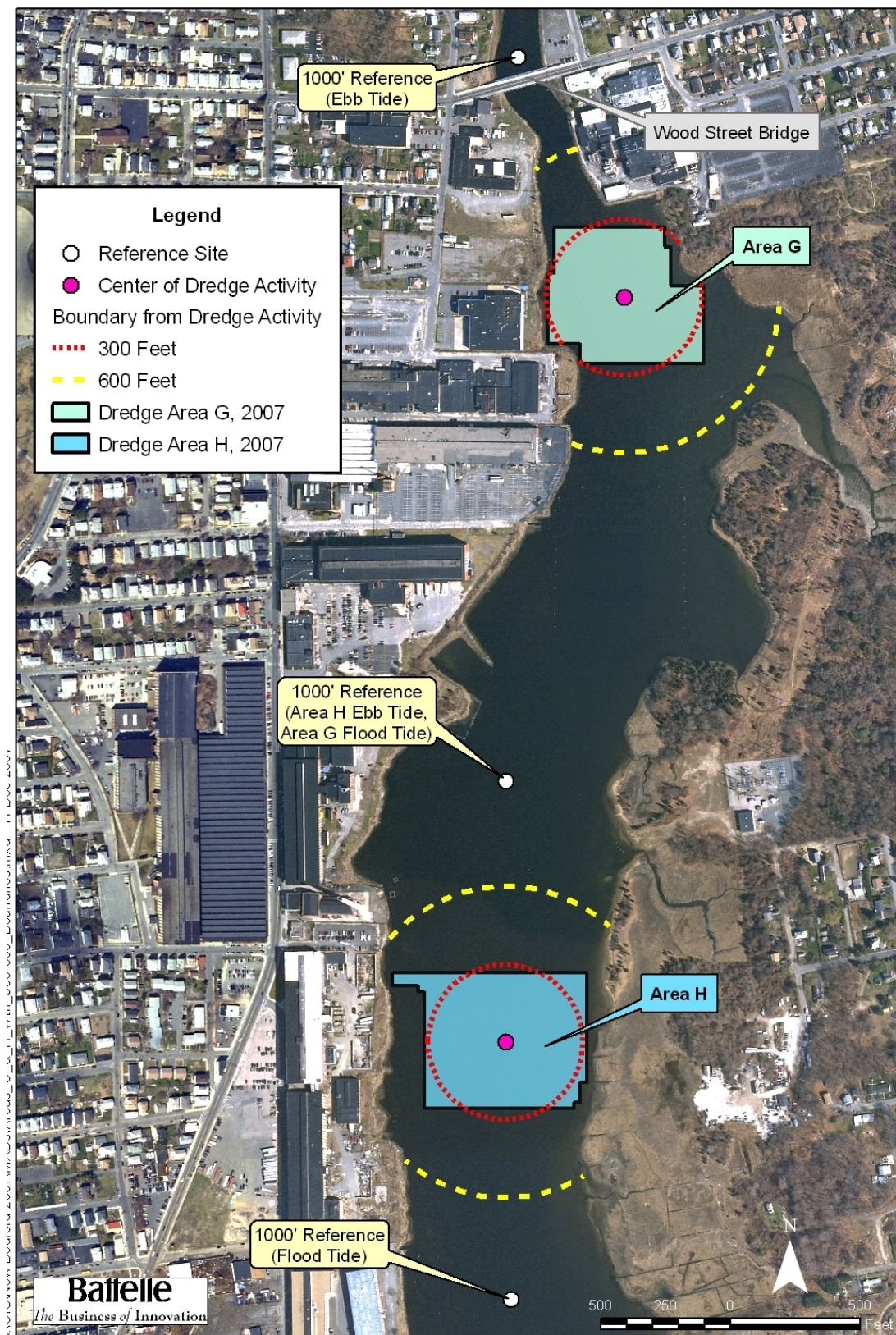


Figure 4. Example of Monitoring/Sampling Locations (Relative to Dredge Areas G & H).



2.0 METHODS

Methods used to establish the sampling approach, conduct *in-situ* measurements, and collect and analyze discrete samples are summarized below. Complete details are also provided in the project Quality Assurance Project Plan (QAPP, Battelle 2006a) and the Water Quality Field Sampling Plan (FSP) (Battelle, 2006b).

2.1 Sampling Approach

The established sampling approach for this program employs a variety of sampling methods to characterize sediment resuspension, sediment transport, and its potential impact on water quality. As with previous monitoring efforts, a tiered approach is employed using varying levels of monitoring intensity to assess and gauge project related water quality impacts as described in Section 2.1.1. Water quality monitoring is performed along transects immediately adjacent to the dredge operation, at defined distances down-current, and at an up-current reference station as described in Section 2.1.2.

2.1.1 Sampling Design

The overall approach utilizes an adaptive, criteria-based sampling scheme to monitor project-related water quality impacts. This is broken up into a series of sampling ‘levels’ which vary in the degree to which analytical samples are collected. The more intensive levels were utilized when there was greater potential for a specific dredging activity to have an impact on water quality. This was particularly true for new activities or activities in new areas. Based on information from these sampling levels, sampling was reduced to the lower intensity levels when appropriate. Sampling Levels I, II, and III are designed to collect water samples at designated distances away from the dredge operation to limit the extent of impact (Boundary, 300 ft, and 600 ft). A reference station located 1,000 feet up-current from the dredge area (see Section 2.1.2) is used to establish background turbidity readings. Based on results acquired throughout the monitoring season, a second type of sampling was added to the design. Under this approach, specific levels of turbidity were targeted for sampling regardless of their location relative to dredging. This approach was added to evaluate relationships, if any, among the turbidity, PCB, and toxicity data and to confirm that current criteria are adequately protective of the aquatic environment. These approaches are discussed below. The criteria-based sampling, which followed the decision sequence, is illustrated in Figure 5. Table 1 lists all sample collection information.

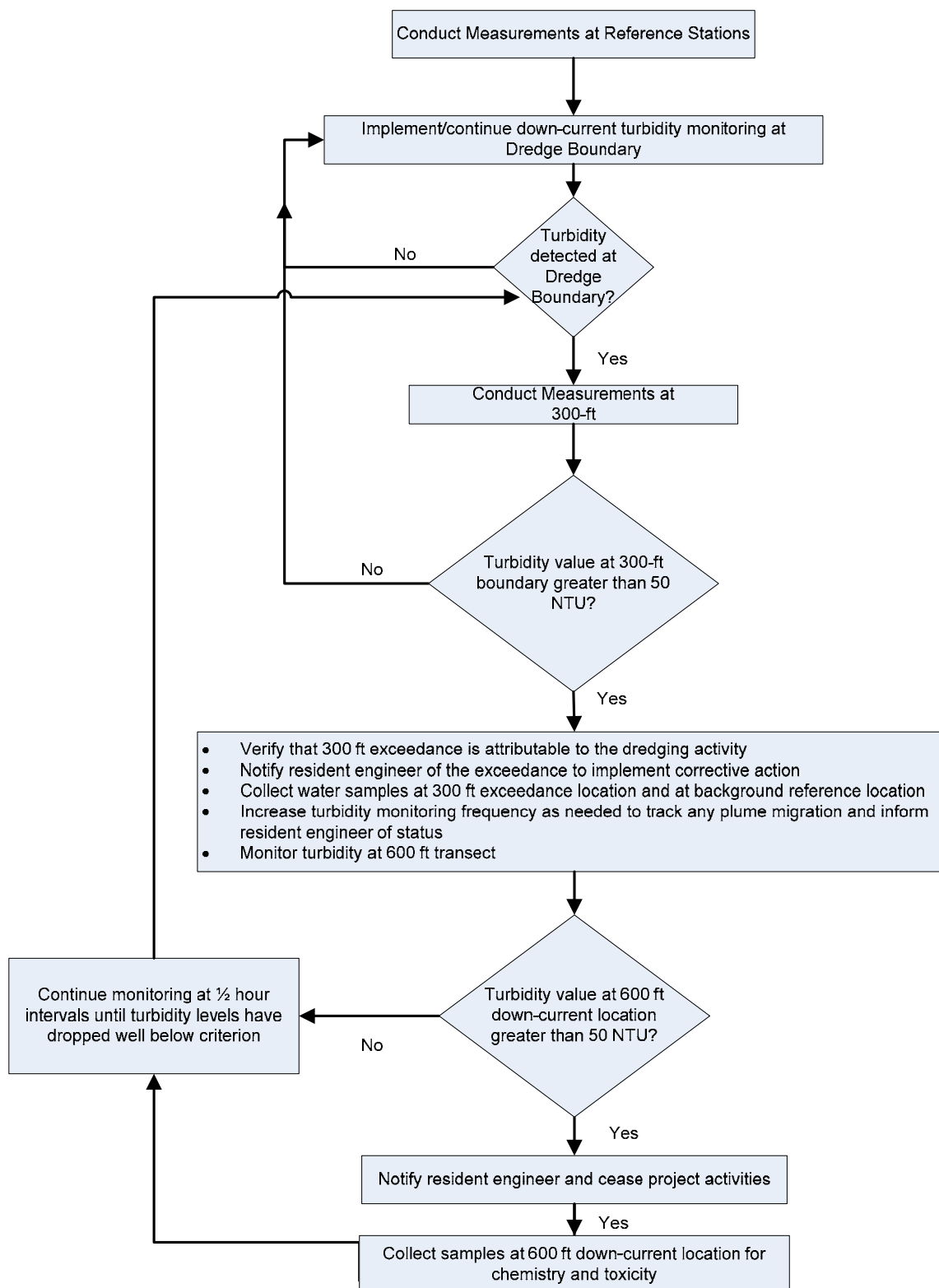
- **Level I:** Level I represents a sampling approach for discrete samples and was conducted for those activities considered to have the greatest potential to impact water quality or when new conditions were encountered. Initially discrete samples were collected at designated locations: Reference, Dredge Boundary, 300 ft downstream, and 600 ft downstream. At each station discrete water samples were collected for all parameters from the depth of highest turbidity, based on the *in situ* readings.

During the 2006 monitoring season it was observed that sampling under Level I, while achieving its objectives, did not capture any significant elevated turbidity levels above background at the downfield transects. As a result, Level I sampling was modified to include additional discrete sample collections at locations having a full range of turbidities (25-100 NTU) that could be used to evaluate the protectiveness of the warning



and project turbidity criterion. This sampling modification was also conducted during the 2007 monitoring season. In all cases it was necessary to sample in close proximity (<300 ft) from debris removal operations to collect high turbidity samples; samples were often collected within 75 ft from dredge operations. These samples were obtained to evaluate turbidity/PCB/toxicity relationships and did not represent exceedances of water quality criteria.

- **Level II:** Level II represents a lower level of monitoring intensity compared to Level I, and is performed under conditions where there is a decreased concern for water quality impacts from an activity. Similar to Level I, Level II was designed to collect samples based on distance from dredge activities although 600 ft samples are not required due to the decreased concern for far-field impact(s). Similar to Level I, modifications were made during the dredge season to adequately characterize the sediment plume which was rarely found near the pre-established transects.
- **Level III:** Routine *in situ* monitoring. Sampling was conditional based on results of turbidity monitoring. Furthermore, a Level III monitoring effort was contingent upon any exceedance of the project-based criterion or based on detection of sheens or plumes emanating from the project area. It should be noted that at no point during the 2007 season were any of the Level III criteria exceeded. As a result no samples were analyzed under the Level III design.
- **Field QC:** Field duplicates were collected at a frequency of approximately one per twenty samples for PCB, TSS, and Turbidity analysis. Equipment blanks for water samples were collected at a frequency of one per twenty samples for PCB, TSS, and Turbidity analysis. QC samples were collected based upon opportunity during planned sampling events.



Notes: 1:50 NTU value was defined as 50 NTU above background turbidity level

Figure 5. Decision Sequence for Water Quality Monitoring.



Table 1. Samples Collected During the 2007 Monitoring Season.

Week	Date	Monitoring Level	Sample Description ¹	Sample ID	Parameters ²
1	8/6/07	III	NA	NA	NA
	8/7/07	III	NA	NA	NA
	8/8/07	III	NA	NA	NA
	8/9/07	Level I (Background)	Mid-Reference-Area H	WQ-XXX-001-080907	DPC, TPC, TSS, TUR, TOX, MET
			13 NTU-Area H	WQ-XXX-002-080907	DPC, TPC, TSS, TUR, TOX, MET
			20 NTU-Area H	WQ-XXX-003-080907	DPC, TPC, TSS, TUR, TOX, MET
			55 NTU-Area H	WQ-XXX-004-080907	DPC, TPC, TSS, TUR, TOX, MET
2	8/13/07	III	NA	NA	NA
	8/14/07	III	NA	NA	NA
	8/16/07	II	Wood St. Reference-Area G	WQ-XXX-001-081607	TSS, TUR, MET
			200 ft S from Debris Removal-Area G	WQ-XXX-002-081607	TSS, TUR, MET
			Dredge Boundary, Area G	WQ-XXX-003-081607	TSS, TUR, MET
			300 ft S of Dredge Boundary, Area G	WQ-XXX-004-081607	TSS, TUR, MET
	8/17/07	III	NA	NA	NA
3	8/20/07	III	NA	NA	NA
	8/21/07	III	NA	NA	NA
	8/22/07	III	NA	NA	NA
4	8/27/07	III	NA	NA	NA
	8/28/07	III	NA	NA	NA
	8/29/07	II	Wood St. Reference-Area G	WQ-XXX-001-082907	TSS, TUR
			75 ft from Debris Removal-Area G	WQ-XXX-002-082907	TSS, TUR
			Dredge Boundary, Area G	WQ-XXX-003-082907	TSS, TUR
			300 ft from Dredge Boundary, Area G	WQ-XXX-004-082907	TSS, TUR
5	9/4/07	III	NA	NA	NA
	9/5/07	III	NA	NA	NA
6	9/10/07	III	NA	NA	NA
	9/11/07	I	Wood St. Reference-Area G	WQ-XXX-001-091107	DPC, TPC, TSS, TUR, TOX, MET
			23 NTU, 75 ft from Debris Removal-Area G	WQ-XXX-002-091107	DPC, TPC, TSS, TUR, TOX, MET
			60 NTU, Area G	WQ-XXX-003-091107	DPC, TPC, TSS, TUR, TOX, MET
	9/12/07	III	NA	NA	NA
	9/14/07	III	NA	NA	NA
7	9/17/07	III	NA	NA	NA
	9/19/07	III	NA	NA	NA
8	9/24/07	III	NA	NA	NA
	9/25/07	II	55 NTU-75 ft S of Dredge-Area H	WQ-XXX-001-092507	TSS, TUR
			90 NTU-50 ft S of Dredge-Area H	WQ-XXX-002-092507	TSS, TUR
			10 NTU-100 ft S of Dredge-Area H	WQ-XXX-003-092507	TSS, TUR
9	10/1/07	III	NA	NA	NA
	10/2/07	III	NA	NA	NA
	10/3/07	I	50 ft N of Dredge-Area H	WQ-XXX-001-100307	DPC, TPC, TSS, TUR, TOX, MET
			300 ft N of Dredge-Area H	WQ-XXX-002-100307	DPC, TPC, TSS, TUR, TOX, MET
			600 ft N of Dredge-Area H	WQ-XXX-003-100307	DPC, TPC, TSS, TUR, TOX, MET
10	10/8/07	III	NA	NA	NA
	10/9/07	III	NA	NA	NA

¹ Samples are collected either based on distance (i.e., 300 ft, 600 ft) or Turbidity levels (i.e., 25, 50 NTU), see Section 2.1 for further discussion on Sample Location.

² DPC =Dissolved PCB, TPC =Total PCB, TSS =Total Suspended Solids, TUR =Turbidity, TOX =Toxicity, MET =Metals
NA – Not Applicable



2.1.2 Sampling Stations

Boat-based monitoring focused on the following areas:

Reference Station: At the start of each sampling day the vessel transited to the reference location located 1,000 ft up-current from the active dredge area. This location was outside the influence of any localized turbidity sources (e.g., combined sewer overflow discharges or storm water drains), and was representative of the water flowing through the deeper channel areas up-current of the dredge area. Water depth was measured with a lead-line and the result recorded in the field log. The *in situ* sensors were lowered slowly and allowed to equilibrate at one foot intervals through the water column with care taken to avoid placing the instruments on the sediment bottom. As the sensors were lowered, the sampling personnel observed the turbidity readings and identified the depth of the highest turbidity values. After the full “downcast” was completed, the sensors were pulled back up through the water column and held at the location of highest turbidity. The *in situ* readings for all parameters at this depth were recorded on the Field Log Sheet. This reading served as the background value for subsequent turbidity readings taken throughout the day. Discrete samples were collected as required (see Section 2.1). Reference locations were re-sampled if conditions changed during the day. Examples of relevant changes include change in tidal flow; change in dredge operations; and changing weather conditions such as rain events which can dramatically alter ambient water quality conditions. Re-sampling of the reference location was conducted at the field team’s discretion based on real-time data feedback and field observations.

Dredge Boundary: Following the collection of *in situ* and discrete samples at the reference location, the sampling team transited to the down-current side of dredging operations. *In situ* readings were collected as close to the dredge, or other operations, as safety allowed; *in situ* readings were collected in the same manner described above for the reference location. Discrete samples were collected (Section 2.1), if required based on the sampling requirements for that survey day (i.e. Levels I, II, and III).

300 ft Downstream: 300 ft downstream from the dredge operations, the vessel operated along a transect (Figure 4) across the width of the harbor collecting *in situ* readings. Real-time data was used to identify any suspended sediment plumes. The focus was on identifying the centroid of the plume (highest turbidity readings) as well as the plume boundaries (lowest turbidity readings above background). High and low readings along the transect were recorded to show the relative intensity of the plume as well as its spatial dimensions. Once the centroid was identified, subsequent readings were concentrated at this location to identify fluctuations in the plume intensity and potential exceedances of the warning criterion. Discrete samples were collected (Section 2.1), if required based on the sampling requirements for that survey day (i.e. Levels I, II, and III).

600 ft Downstream: 600 ft downstream from the dredge operations, *in situ* readings were collected along a transect across the width of the river (Figure 4). Discrete samples were collected (Section 2.1), if required based on the sampling requirements for that survey day (i.e. Levels I, II, and III).



Fixed point, continuous *in situ* sensors: *In situ* data were also collected using YSI sondes (6920 water quality sensors), with internal data logging, deployed at fixed locations for extended periods of time. The sensors recorded water temperature, salinity, dissolved oxygen, and turbidity. The sensors were deployed on August 14, 2007 during the first week of dredging and remained in use until October 16, 2007, approximately 1 week after the cessation of dredge related activities. Their location and depth were primarily distributed where the majority of dredging activities would be occurring each week. The objective of *in situ* sensor was to supplement the boat-based monitoring. Deployment locations included one upstream and one downstream of the active dredge area (Figure 6). The upstream sensor was located approximately 100 to 130 ft north of the active dredge area and the downstream sensor was located approximately 100 to 130 ft south of the active dredge area. The sensors were deployed on ‘J’-shaped moorings with a surface marker buoy on a slack line and a subsurface buoy on a taught line from which the sensor was suspended (Figure 7). Tidal fluctuations resulted in water depths at the mooring locations ranging from approximately two to seven feet. Due to the relatively shallow water at the deployment locations and the large tidal fluctuation, a sampling configuration was designed which maximized characterization of the entire water column while keeping the sensors from resting on the bottom. Typically at low tide, the sensors were suspended within one foot of the water surface and at high tide the sensors were approximately three feet off the bottom.

The sensors were programmed to sample every 10 minutes. The instruments were retrieved and deployed as part of the boat-based monitoring program. The instruments were recovered periodically for data retrieval and routine maintenance. Between each deployment, the sensors were cleaned, recalibrated, the data were downloaded, and the batteries were replaced as needed.

2.2 *In Situ* Measurements

In situ measurements of depth, turbidity, temperature, salinity, and dissolved oxygen were acquired at a series of stations within the project site (see Section 2.1.2) using a YSI sonde (6920 water quality sensors) with real-time display and data logging. Monitoring combined preplanned measurements to support discrete sampling as described below and criteria-based sampling following the decision sequence in Figure 5.

The Acushnet River is tidally influenced and the tide together with variability in freshwater flow determines the current direction and its influence on transport of suspended sediments. On ebb tides, “downstream” is always to the south of dredging activities. However, on flood tides flow is often, though not always, to the north. Several times throughout the 2007 monitoring program a clear stratification of the water column was observed. In these cases lower density freshwater sat on top of higher density, more saline tidal waters. Frequently the incoming tidal water was moving north, while the freshwater lens was flowing south. These physical water properties were closely monitored throughout the day, and adjustments were made in the sampling design to accurately assess sediment resuspension and its transport in all directions. Throughout this report the terms “downstream” and “down-current” always refer to the direction of water movement relative to the dredging operations at that point in time regardless of geographical direction (north or south).

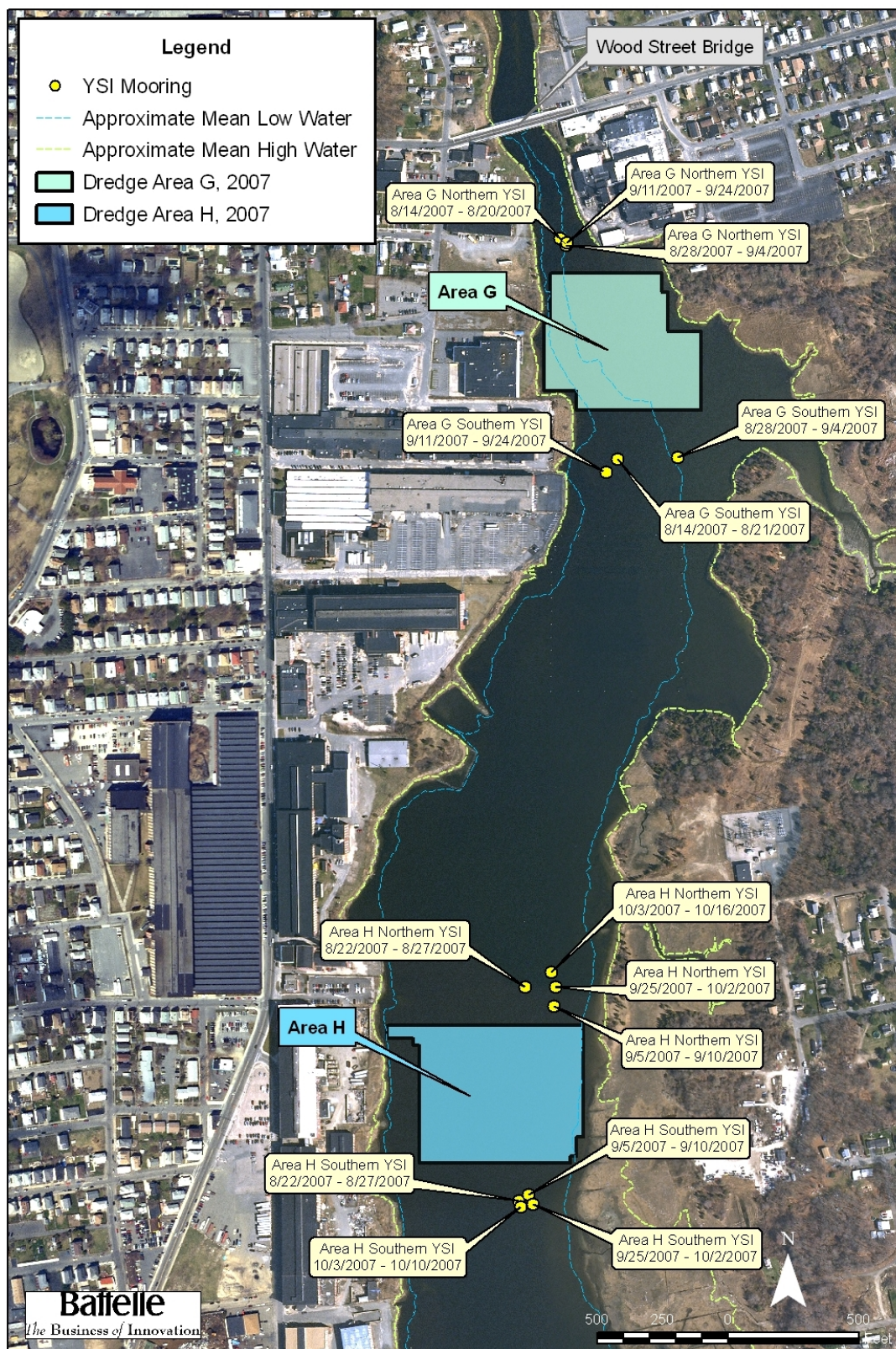


Figure 6. Location of Fixed Point, Continuous *In Situ* YSI Sensors

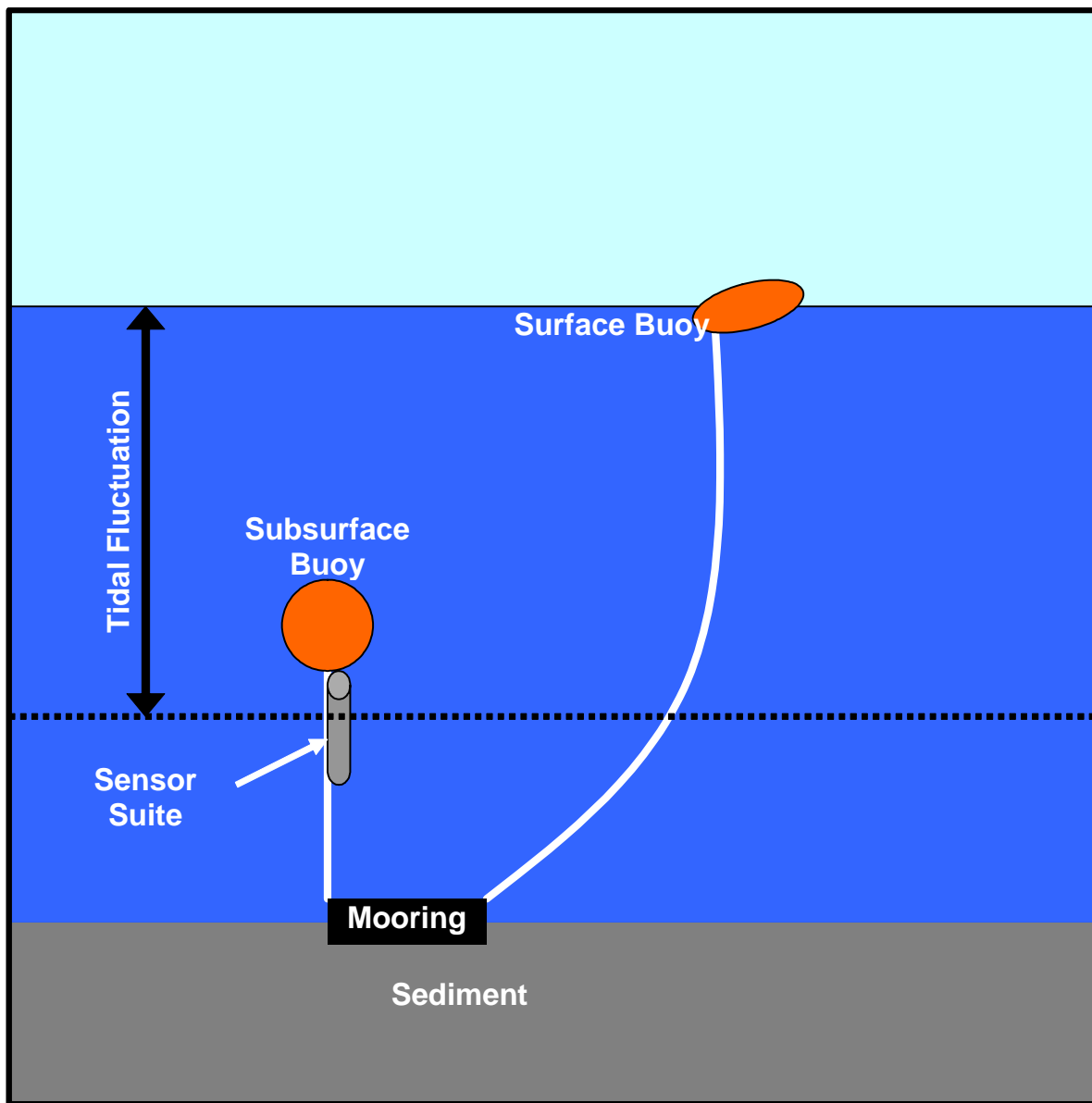


Figure 7. Depiction of the Continuous *In Situ* Sensor Mooring Configuration



2.3 Discrete Water Samples

Water samples collected for physical, chemical, and biological testing during the 2007 monitoring season are summarized in Table 1. The collection of discrete water quality samples was conducted using a water pump and instrument package during boat-based monitoring. Water samples were collected using a 12-volt Teflon diaphragm pump and the appropriate length of Teflon® tubing. The inlet of the tubing was attached to the body of the YSI *in situ* sensors to ensure that the sensor measurements and the analytical results are representative of the same parcel of water. Prior to collecting samples at each location sample, water was pumped continuously through the system for approximately two to three minutes to purge the system. This purging ensured that the system was cleared prior to actual sample collection to avoid potential site to site cross-contamination.

Following purging, water from the pump outlet was collected directly into the appropriate sample containers for physical, chemical or biological analysis. Sample volume, container, preservation, storage conditions, holding time and participating laboratory is summarized in Table 2 for each analysis parameter. All samples collected in the field were placed in coolers on ice until transport to the field trailer. At the field trailer, samples were stored cold ($4 \pm 2^\circ\text{C}$) in the sample refrigerator or on ice in the coolers until packaged for shipment to the participating laboratories. Samples were packaged in wet or blue ice and were hand delivered or shipped overnight to the appropriate laboratories.

Table 2. Sample Volumes, Containers, and Processing for Discrete Field Samples.

Parameter	Sample Volume	Sample Container	Preservation	Storage Condition	Holding Times ¹	Analytical Lab
TSS	1 L	HDPE Bottle	Ice	$4 \pm 2^\circ\text{C}$	7 Days	Alpha Woods Hole Lab 375 Paramount Drive, Suite 2 Raynham, MA 02767 Ph: 508-822-9300
Turbidity					48 Hours	
Aqueous Total PCB	1 L	Wide-mouth Amber Glass Bottle	Ice	$4 \pm 2^\circ\text{C}$	7 Days	Battelle Duxbury² 397 Washington Street Duxbury, MA 02332 Ph: 781-952-5200
Aqueous Dissolved PCB ³	1 L	Wide-mouth Amber Glass Bottle	Ice	$4 \pm 2^\circ\text{C}$	7 Days	
Total Metals	500 mL	HDPE Bottle	HN03	$4 \pm 2^\circ\text{C}$	6 Months	
Toxicity (all samples for toxicological analysis collected into one container)	5 gal	2.5 gallon Cubitainer	Ice	$4 \pm 2^\circ\text{C}$	24 Hours	EnviroSystems, Inc One Lafayette Road P.O. Box 778 Hampton, NH 03843 Ph: 603-926-3345

¹ Holding time to initial Lab preparation.

² All metals samples were archived at Battelle, Duxbury. If analysis is required, samples will be analyzed by Battelle Marine Sciences Lab in Sequim, Washington.

³ Samples for dissolved analysis were filtered at the analytical laboratory.



2.4 Sample Analysis

Like the field sampling, sample analysis includes both predefined samples and contingency based samples. Figure 8 shows the laboratory based decision sequence for analysis of samples. All samples were delivered to the respective laboratories defined in Table 2.

Requirements for chemical and biological testing can be found in the project QAPP Addendum *Environmental Monitoring, Sampling, and Analysis at the New Bedford Harbor Superfund Site, New Bedford, MA* for detailed analytical requirements (Battelle, 2006a). An overview of the methods used is provided below.

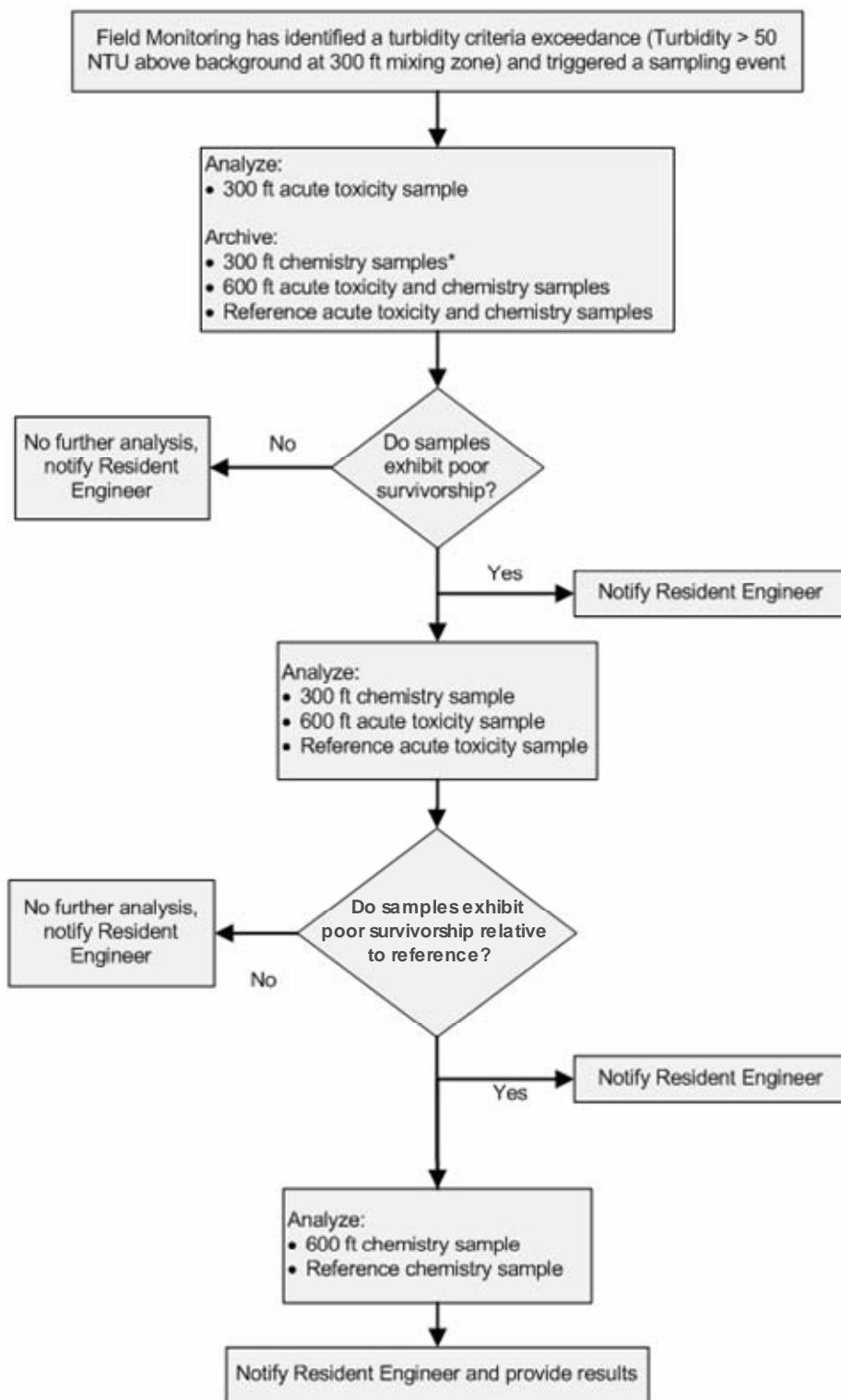
2.4.1 TSS/Turbidity Analyses

In addition to in-situ, real-time turbidity monitoring (Section 2.2), lab-based analyses of discrete water samples for TSS and turbidity were conducted by Alpha Woods Hole Group (AWHG). Water samples were analyzed for TSS following AWHG SOP *Total Suspended Solids (TSS) Non-Filterable Residue*, Rev. 5.0 which is based on EPA Method 160.2. Water samples were analyzed for turbidity following AWHG SOP *Turbidity 180.1*, Rev. 2.2, which is based on EPA Method 180.1. Sample results are reported in milligrams per liter (mg/L) for TSS and NTU for turbidity.

2.4.2 PCB Analyses

PCB analyses for the 18 National Status and Trends (NS&T) congeners were conducted by Battelle, using both whole water (unfiltered) and dissolved (filtered) samples. Water samples designated for dissolved PCB analysis were filtered through pre-baked glass fiber filters (1 micron pore size) at the analytical laboratory. The sample filtration was usually conducted within 24 hours of sample collection.

All water samples (total and filtered) were extracted following modified EPA Method 3510C (Battelle SOP 5-200). Approximately one liter of the water sample (total or filtered) was spiked with surrogates and extracted three times with dichloromethane using separatory funnel techniques. The combined extract was dried over anhydrous sodium sulfate, concentrated, and treated with copper for sulfur removal. The extract was then processed through disposable Florisil columns for further clean-up. The post Florisil extract was concentrated, fortified with internal standards (IS), and then analyzed for 18 NS&T PCB congeners using gas chromatography/electron capture detector (GC/ECD) using dual column confirmation, following modified EPA Method 8082 (Battelle SOP 5-128). Sample data were quantified by the method of internal standards, using the IS compounds. Due to the highly-contaminated nature of the samples, most of the water sample extracts were diluted and analyzed again to resolve concentrations of compounds that exceeded the calibration range during the initial GC/ECD runs. Sample results are reported in micrograms per liter ($\mu\text{g/L}$).



*Note: "chemistry samples" = Total and Dissolved PCB samples.

Figure 8. Decision Sequence for Sample Analysis



2.4.3 Toxicity Analyses

Acute and chronic (sub-lethal) exposure screening assays evaluating surface water samples collected from New Bedford Harbor were performed to evaluate the potential toxicity of surface water samples collected in New Bedford Harbor associated with dredging activities. Assay design included a laboratory control treatment and one or more surface water samples, generally including a site reference sample. Samples were evaluated “As Received” without dilutions. Testing was based on programs and protocols developed by the USEPA (2002) primarily designed to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. Testing included the following assays: modified 2 day acute and 7 day chronic assays conducted with the mysid shrimp, *Americamysis bahia*, and the red macro alga, *Champia parvula*, and 60 minute chronic fertilization assays conducted with the purple sea urchin, *Arbacia punctulata*. All mysid and urchin fertilization assays and a portion of the algal assays were conducted by EnviroSystems, Inc. (ESI) located in Hampton, New Hampshire. Additionally, the algal assays were conducted by the Saskatchewan Research Council, SRC, Saskatoon, Saskatchewan, Canada. Supporting data including laboratory bench sheets, full statistical reports, custody forms, sample receipt forms and water quality data are provided in Appendix D.

2.4.3.1 Test Species

A. bahia, #5 days old, were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. Juvenile shrimp were collected daily, isolated, and placed in a rearing tank for up to 6 days. Holding tanks were maintained in a flow-through culture mode at a temperature of $25\pm 2^{\circ}\text{C}$. At the start of the assays the mysids were 7 days old. Juveniles were fed #24 hour old brine shrimp on a daily basis. Water temperature, salinity, and pH were monitored on a daily basis. Prior to testing organisms were siphoned from the rearing tanks to a holding vessel, and then transferred to test chambers using a large bore pipet, minimizing the amount of water added to test solutions.

A. punctulata adults were from cultures maintained by ESI. Original stock was obtained from commercial supply. Male and female urchins were maintained in separate chambers as recommended by protocol (USEPA 2002) and ESI. Adult urchins were induced to spawn by the injection of a potassium chloride solution. The viability of gametes obtained was determined prior to their addition to the test solutions. Eggs and/or sperm that would not result in a fertilized egg were rejected from the pool of gametes used in the assay.

C. parvula biomass was obtained from stock cultures maintained by the Saskatchewan Research Council. Original stocks were obtained from the University of Texas algal collection. The male and female plants were maintained in separate culture vessels under sterile conditions. Algal cultures were maintained on an orbital shaker (100 rpm) at $23\pm 2^{\circ}\text{C}$ under 16 hour light: 8 hours dark at 40 to 75 foot candles light intensity. Cultures are “cropped” and transferred to fresh nutrient solutions on a weekly basis.

2.4.3.2 Surface Water Samples and Laboratory Control Water

Grab surface water samples were collected by Battelle staff on each of the three Level I surveys in the Harbor (see Toxicity in Table 1). Samples were placed in polyethylene cubitainers for



shipment to the laboratory. Two 2.5-gal cubitainers were collected for each of the chronic assays. Prior to testing in the lab, samples were evaluated to document salinity, conductivity, and total residual chlorine. Total residual chlorine was measured by amperometric titration (MDL 0.05 milligrams per liter, mg/L). Prior to use in the assays the salinity of the samples was adjusted, if necessary, to predetermined levels using artificial sea salts for *A. bahia* and *A. punctulata* assays, and GP-2 salts (USEPA 2002) for the *C. parvula* assays. The salinity of samples for the *A. bahia* acute and chronic exposure assays was adjusted to $25 \pm 2\text{‰}$ while the salinity for samples used for the *A. punctulata* and *C. parvula* assays was adjusted to $30 \pm 2\text{‰}$. Samples with initial salinity measurements above these levels were not adjusted.

Laboratory control water used for mysid and sea urchin assays was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981. The laboratory control water used in the algal assay, collected from Rye, New Hampshire, is the same water used in culture maintenance. Prior to use, seawater used in the algal assays was filtered through glass fiber filters and sterilized. Dilution water used in the algal assays conducted by SRC was natural seawater collected from the West Coast of Canada. Salinity of the surface water samples was adjusted using commercial sea salts.

2.4.3.3 Bioassay Tests

***Americamysis bahia* Modified Acute and Chronic Exposure Bioassays**

Modified acute and chronic exposure screening assays were conducted in a static renewal test mode with renewals made at 24-hour intervals. The 7 day assays were conducted at a temperature of $26 \pm 1^\circ\text{C}$ with a photoperiod of 16:8 hours light:dark. Mysids were maintained in 250 mL beakers containing 150 mL of test solution. Approximately 100 mL of the test solution were replaced each day. The assay incorporated 8 replicates with 5 organisms/replicate. Survival and dissolved oxygen were measured daily in each replicate prior to test solution renewal. Salinity, temperature and pH were recorded in a composite sample of the “old” test solution and in the “new” test solution prior to being added to the test chamber. Incubator temperatures were also recorded on a daily basis.

During the test, mysids were fed 24 hour old *Artemia* nauplii. On Day 7 of the assay, surviving mysids were removed from test solutions, rinsed to remove any surface detritus and salts, and transferred to tared foils and dried for 24 hours at 103°C . Foils were weighed to the nearest 0.01 mg. Mean dry weights per individual were obtained by dividing the net dry weight of all surviving organisms by the number of organisms added at the start of the assay.

***Arbacia punctulata* Chronic Exposure Fertilization Assays**

Gametes were obtained by potassium chloride injection to induce spawning. Sperm were collected dry, diluted to achieve a concentration of approximately 5.0×10^7 sperm/mL in the surface water treatments. Actual sperm concentrations are provided on laboratory bench sheets in Appendix D. Sperm solutions were added to 5 mL aliquots of each sample being evaluated and allowed to remain in the test solutions for 60 minutes before the addition of unfertilized eggs.

Each treatment incorporated a total of four replicates. After 20 minutes of exposure the assay was terminated by the addition of 0.2 mL of preservative. Aliquots of preserved solution were



counted to determine numbers of fertilized and unfertilized eggs. Fertilization was accepted based on the presence or absence of a fertilization membrane around the egg.

***Champia parvula* Modified Acute and Chronic Exposure Assays**

The 7 day red algae assay was conducted with a 2 day exposure period to the surface waters and laboratory control treatments. Each treatment used four replicates with five female branches and one male branch per replicate. Temperature was maintained at $23\pm1^{\circ}\text{C}$. The light source was cool white and fluorescent bulbs set on a 16:8 hours light:dark cycle, with a light intensity of 40 to 75 foot candles. Light intensity was checked at the start of each assay. Temperatures were monitored on a daily basis. Test chambers were 200 mL borosilicate glass beakers. After 2 days exposure, female branch tips were transferred to approximately 100 mL of recovery medium with added nutrients and allowed to recover and mature for 5 days. During transfer, plants were examined to determine the physical condition of the individual branches. Branches showing signs of degeneration were noted and used to establish an acute endpoint. After the recovery period, the number of cystocarps (reproductive bodies) on each female branch were counted.

2.4.3.4 Data Analysis

Statistical analysis of acute and chronic exposure data was completed using CETIS (Comprehensive Environmental Toxicity Testing System) software. The program computes acute and chronic exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For chronic exposure endpoints statistical significance was accepted at $p < 0.05$.

2.4.3.5 Quality Control

As part of the toxicity testing laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species to provide relative health and response data while allowing for comparison with historic data sets.



3.0 SURVEY CHRONOLOGY AND DAILY OBSERVATIONS

All turbidity readings referenced in this section are the actual values from the sensor and are not corrected for background levels. High and low tide data for each day that water quality monitoring was performed during operations is summarized below; all times are Eastern Daylight Time (EDT). Complete tide data over the course of the entire 2007 dredge season are also provided in Appendix A.

Week of August 6, 2007 (Week 1)

August 6, 2007:

- **Tidal stage:** High tide at 2:13 and 14:51 EDT; low tide at 7:38 and 20:57 EDT.
- **Dredge activity:** No active dredging, testing of dredge lines. Debris removal in Area H.
- **Monitoring activity:** First day of water quality monitoring. Monitored low water and flood tide. Shakedown of equipment, identifying sample locations, and site access.
- **Fishery and Wildlife Observations:** Bait fish active throughout area with gulls and terns feeding.
- **Results summary:** Readings collected at reference locations, values 4.5 NTU. Elevated turbidity values in close proximity to debris removal, <20 NTU from distance greater than 200'. No samples collected. Oil sheen observed around debris removal activity moving up to 1,000' North of debris removal.

August 7, 2007:

- **Tidal stage:** High tide at 3:18 and 15:55 EDT; low tide at 8:44 and 22:25 EDT.
- **Dredge activity:** No active dredging, testing of dredge lines. Debris removal in Area H.
- **Monitoring activity:** Level III monitoring. Monitored low water and flood tide.
- **Fishery and Wildlife Observations:** Bait fish activity noted within and outside of dredge area. 2-3 small fish were noted near southern oil boom.
- **Results summary:** Readings collected at reference location, value of 2-4 NTU, 150 ft down-current of debris removal value of 30-40 NTU, and 400 ft down-current a value of 5-10 NTU. No samples collected. Slight oil sheen observed outside boom in the morning. Oil sheen increased later in the morning, turbidity remained low.

August 8, 2007:

- **Tidal stage:** High tide at 4:23 and 16:57 EDT; low tide at 10:00 and 23:42 EDT.
- **Dredge activity:** Actively dredging in Area H. Debris removal in Area H. Dredge in Area H broken. Moved working dredge from Area G to Area H and broken dredge from Area H to dock.
- **Monitoring activity:** Level III monitoring, ebb tide to low water and 1.5 hours of flood.
- **Fishery and Wildlife Observations:** A few small fish observed outside of Area H. Numerous birds were observed South of Area H.
- **Results summary:** No significant turbidity plumes around dredge activities. Readings collected at reference locations, value 4.8 NTU, North Dredge Boundary Area value of 20.3 NTU, South Dredge Boundary Area value of 8-9 NTU, and North Dredge Boundary Area value of 30-40 NTU about 150 ft down-current of active dredge. No samples



collected. Some oil sheen observed around debris removal. Localized sheen observed North of Area H when actively dredging in morning, contained by oil booms and dissipated quickly.

August 9, 2007:

- **Tidal stage:** High tide at 5:25 and 17:55 EDT; low tide at 11:16 EDT.
- **Dredge activity:** Actively dredging in Area H. Debris removal in Area H. Dredge repair.
- **Monitoring activity:** Level I monitoring ebb tide.
- **Fishery and Wildlife Observations:** Birds observed above and below dredge area.
- **Results summary:** No significant turbidity plumes around dredge activities. In order to obtain consistent readings near 55 NTU, the monitoring had to get within about 100-150 ft of debris removal area. Prop wash in shallow water resulted in spikes of 90-100 NTU, which dissipated very quickly. Collected toxicity, TSS, Turbidity, total and dissolved PCBs, and metals samples based on turbidity. No oil sheen observed.

Week of August 13, 2007 (Week 2)

August 13, 2007:

- **Tidal stage:** High tide at 8:45 and 21:06 EDT; low tide at 2:42 and 14:47 EDT.
- **Dredge activity:** Actively dredging in Area H. Debris removal in Area H.
- **Monitoring activity:** Level III monitoring. Monitored ebb tide.
- **Fishery and Wildlife Observations:** No negative impacts to fish passage observed, fish noted within and outside dredge area moving freely.
- **Results summary:** Turbidity readings collected at reference locations and out to 600 ft South of Dredge Area H, turbidity readings were <20 NTU (range 1.4-14.3 NTU) at all locations. Turbidity levels detected were mainly associated with debris removal. Very minor oil sheen observed around debris removal, contained by oil boom.
- **Exceedances and sample collections:** None.

August 14, 2007:

- **Tidal stage:** High tide at 9:28 and 21:46 EDT; low tide at 3:13 and 15:24 EDT.
- **Dredge activity:** No active dredging. Debris removal in Area G.
- **Monitoring activity:** Level III monitoring. Monitored ebb tide. Deployed moorings north and south of Area G.
- **Fishery and Wildlife Observations:** No evidence of fish damming or dead or impaired fish observed as well as any indications of fish passage obstruction observed along pipeline between the two active dredge areas or within Area G. Birds observed above and below dredge Area G.
- **Results summary:** Turbidity readings collected at Wood St. reference location and mooring locations North and South of Area G, turbidity readings were <20 NTU (range 7.3-15.8 NTU) at all locations. Oil sheen and small debris observed during debris removal, all contained by oil boom.
- **Exceedances and sample collections:** None.



August 16, 2007:

- **Tidal stage:** High tide at 10:50 and 23:06 EDT; low tide at 4:09 and 16:31 EDT.
- **Dredge activity:** No active dredging in Area G, dredge set up. Debris removal in Area G.
- **Monitoring activity:** Level II monitoring. Monitored high water, ebb and flood tide.
- **Fishery and Wildlife Observations:** Birds observed in all areas. Several dozen dead fish were observed along western shore of the Acushnet River, approximately 800-900 ft North of Wood St. A dead bird was observed tangled in the oil boom and a dead duck was observed approximately 800 ft north of Wood St.
- **Results summary:** Turbidity readings collected at Wood St. reference location, North of Wood St., 200 ft from debris removal in Area G, and dredge boundary, turbidity readings were <20 NTU (range 3.4-16 NTU) at all locations. Heavy oil sheen observed in northern part of area and migrating up river, wind dissipated sheen slightly by mid-day. Oil sheen also observed along shore line North of Wood St.; notified S. Fox, M. Gouveia, and P. L'Heureux that sheen was not being contained by oil booms and that dead fish had been observed north of Wood Street.
- **Exceedances and sample collections:** No exceedances of the turbidity criteria were noted. Under Level II sampling pre-planned samples were collected for TSS, turbidity, and metals analysis.

August 17, 2007:

- **Tidal stage:** High tide at 11:32 and 23:46 EDT; low tide at 4:37 and 17:04 EDT.
- **Dredge activity:** Actively dredging in Area G. Debris removal in Area G.
- **Monitoring activity:** Level III monitoring. Monitored high water, ebb tide.
- **Fishery and Wildlife Observations:** Schooling and feeding fish at North of Wood St. Bridge. Dead fish were noted in dredge Area G.
- **Results summary:** Turbidity readings were 20-50 NTU within 100 ft of debris removal to <20 NTU throughout the dredge area. Light to heavy oil sheen observed moving northwest to southeast corner of the dredge area from debris removal.
- **Exceedances and sample collections:** None.

Week of August 20, 2007 (Week 3)

August 20, 2007:

- **Tidal stage:** High tide at 1:18 and 13:54 EDT; low tide at 6:21 and 19:10 EDT.
- **Dredge activity:** Actively dredging in Area G. Debris removal in Area G.
- **Monitoring activity:** Level III monitoring. Monitored flood tide.
- **Fishery and Wildlife Observations:** Birds observed north and south of the dredge area. Dead fish were not observed.
- **Results summary:** Retrieved moorings from north of dredge area. Observed localized high turbidity values near dredge and debris removal (50-60 NTU with spikes of 80-100 NTU). A very thin plume layer traveled down current, as the plume reached the dredge boundary, the turbidity dropped to 15-20 NTU. Turbidity readings collected at reference location, north dredge boundary, and 300 ft down-current, turbidity readings were ≤20 NTU (range 5-20 NTU). Light oil sheen observed in the morning southwest of the debris removal, contained by oil booms.



- **Exceedances and sample collections:** None.

August 21, 2007:

- **Tidal stage:** High tide at 2:14 and 14:51 EDT; low tide at 7:08 and 20:11 EDT.
- **Dredge activity:** Actively dredging in Area H. Debris removal in Area H.
- **Monitoring activity:** Level III monitoring. Monitored flood tide.
- **Fishery and Wildlife Observations:** No evidence of fish damming or dead or impaired fish observed as well as any indications of fish passage obstruction observed along pipeline between the two active dredge areas or within Area H. Birds observed above and below dredge Area H. Fish were observed within and outside of dredge area.
- **Results summary:** Turbidity readings collected at the reference location south of Area H, the northern boundary of H, 300 ft north of Area H and 600' north of Area H. Turbidity readings were <26 NTU (range 3.2-25.1 NTU) at all locations. Small oil sheen was observed south of debris removal; all was contained by oil boom. A fairly large, but low level turbidity plume was observed during the morning but began to dissipate around 11:30am. The turbidity was around 20-25 NTU at boundary but dropped to approximately 15 NTU at 300 ft outside of the boundary.
- **Exceedances and sample collections:** None.

August 22, 2007:

- **Tidal stage:** High tide at 3:16 and 15:50 EDT; low tide at 8:06 and 21:25 EDT.
- **Dredge activity:** Debris removal and dredging in Area H.
- **Monitoring activity:** Level III monitoring. Monitored flood tide.
- **Fishery and Wildlife Observations:** Birds observed in and around area H.
- **Results summary:** North and South moorings were deployed. Turbidity readings collected at reference location south of Area H, post mooring deployment, dredge gate north, and 300 ft from gate, turbidity readings were <43 NTU (range 3.3-42.5 NTU) at all locations. No oil sheen was observed. A plume similar to the one observed on 8/21/07 was also observed. The turbidity levels were averaging around 18-25 NTU with occasional spikes to 40-60 NTU. When the plume was observed at 300 ft the turbidity dropped to 10-15 NTU and continued to drop rapidly at 550-600 ft from the boundary.
- **Exceedances and sample collections:** None.

Week of August 27, 2007 (Week 4)

Debris removal and push boats working in shallow waters of Area G create elevated turbidity nearing turbidity action levels. Short-lived nature of these plumes resulted in no sample collections driven by criteria exceedances. Widespread surface oil sheens generated by activities in both dredge areas.

August 27, 2007:

- **Tidal stage:** High tide at 7:39 and 19:59 EDT; low tide at 1:11 and 13:18 EDT.
- **Dredge activity:** Debris removal in Area H. Dredging in Areas H and G.
- **Monitoring activity:** Level III monitoring at both dredge areas. Monitored ebb tide.
- **Fishery and Wildlife Observations:** Birds seen working after bait fish between areas G & H. No obstructions to fish passage observed.



- **Results summary:**
 - **Area H:** Widespread, low level suspended sediment plume coming from debris removal activities: 15-25 NTU at 300 ft downstream, 5-10 NTU at 600 ft downstream. Values returned to background levels 700-750 ft from debris removal.
 - **Area G:** Turbidity levels at 15-20 NTU within 300 ft of dredge, 5-10 NTU beyond dredge, and near background at 600 ft. Highest turbidity values associated with push boat activity in shallow water.
- **Exceedances and sample collections:** None.

August 28, 2007:

- **Tidal stage:** High tide at 8:23 and 20:44 EDT; low tide at 1:52 and 14:07 EDT.
- **Dredge activity:** Debris removal and dredging in Area G.
- **Monitoring activity:** Level III monitoring during ebb tide.
- **Fishery and Wildlife Observations:** Several small schools and individual fish noted. No obstructions to fish passage observed.
- **Results summary:** Oil sheens observed as thin films with concentrated areas near dredge and debris removal. Sheen expanded to west by wind. Heavy sheens seen when moving the debris removal equipment. Elevated turbidity was also associated with this activity. Turbidity values of 40-120 NTU were seen 200-400 ft from debris removal. Plumes were very short lived leaving no opportunity to collect elevated turbidity water samples out at the criteria distances.
- **Exceedances and sample collections:** None.

August 29, 2007:

- **Tidal stage:** High tide at 9:08 and 21:29 EDT; low tide at 2:33 and 14:54 EDT.
- **Dredge activity:** Debris removal and dredging in Area H. Debris removal in Area G.
- **Monitoring activity:** Level II during ebb tide.
- **Fishery and Wildlife Observations:** Birds seen working north and south of Area H. Observed numerous bait fish south of Areas H. Also, large numbers of bait fish observed immediately south of Wood St. bridge.
- **Results summary:**
 - **Area H:** Little to no elevated turbidity associated with dredging. Moderately elevated turbidity (15-35 NTU) associated with debris removal.
 - **Area G:** Oil sheen noted north of Wood St. (approximately 350 ft north of bridge). Oil sheen observed prior to peak ebb flow and not contiguous with sheens seen in dredge area. Turbidity associated with debris removal was generally low: 30-40 NTU at 75 ft from debris removal, 15-25 NTU at 300 ft, 10-15 NTU at 600 ft.
- **Exceedances and sample collections:** No exceedances. Samples collected for TSS and turbidity.



Week of September 3, 2007 (Week 5)

Debris removal and push boats working in Area H created elevated turbidity nearing turbidity action levels. Short-lived nature of these plumes resulted in no sample collections driven by criteria exceedances. Surface oil sheens generated by debris removal activities in dredge area H.

September 4, 2007:

- **Tidal stage:** High tide at 1:55 and 14:32 EDT; low tide at 7:19 and 20:53 EDT.
- **Dredge activity:** Debris removal in Area H.
- **Monitoring activity:** Level III monitoring at dredge area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** Birds observed above and below work area. No obstructions to fish passage observed.
- **Results summary:** Oil sheen observed northeast of debris removal. Slight, turbidity elevations associated with debris removal activities: 6-10 NTU at 75-80 ft.
- **Exceedances and sample collections:** None.

September 5, 2007:

- **Tidal stage:** High tide at 3:04 and 15:40 EDT; low tide at 8:35 and 22:29 EDT.
- **Dredge activity:** Debris removal and dredging in Area H.
- **Monitoring activity:** Level III monitoring at dredge area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** Birds observed above and below work area. No obstructions to fish passage observed.
- **Results summary:** Oil sheen observed southeast of debris removal. Observed a widespread turbidity plume northeast of the debris removal. Turbidity values ranged from 25-35 NTU at 200 ft and 10-20 NTU at approximately 300 ft from the debris removal activities. Higher spikes were observed where values reached 40-50 NTU at 275-300 ft. Plumes were very short lived leaving no opportunity to collect elevated turbidity water samples out at the criteria distances.
- **Exceedances and sample collections:** None.

Week of September 10, 2007 (Week 6)

Localized turbidity plume observed with dredge activities in Area G, while higher turbidity values were observed with debris removal in Area H. The turbidity plumes resulted in no sample collections driven by criteria exceedances. In both areas, surface oil sheens were observed. On 9/11/07, very heavy oil sheen, high turbidity values, and fish kills were all observed. Planned samples were collected during this time-frame. Low turbidity values were measured and no oil sheens were observed the remainder of the week.

September 10, 2007:

Area G

- **Tidal stage:** High tide at 7:38 and 19:59 EDT; low tide at 1:44 and 13:54 EDT.
- **Dredge activity:** Debris removal and dredging in Area G. Debris removal barge moved to Area H in the early morning.
- **Monitoring activity:** Level III monitoring at dredge Area G. Monitored ebb tide.
- **Fishery and Wildlife Observations:** Large numbers of gulls were observed working in and around the dredge unit. No obstructions to fish passage observed.



- **Results summary:** Heavy oil sheen observed south of dredge area. Localized turbidity plume of 18-25 NTU observed 75-100 ft from dredge unit, however, the turbidity values returned to background beyond 100 ft.
- **Exceedances and sample collections:** None.

Area H

- **Tidal stage:** High tide at 7:38 and 19:59 EDT; low tide at 1:44 and 13:54 EDT.
- **Dredge activity:** Debris removal in Area H. The dredge was also moved and set-up.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored ebb tide.
- **Fishery and Wildlife Observations:** Birds observed south of dredge unit. Large numbers of fish jumping in southwest corner. No obstructions to fish passage observed.
- **Results summary:** Small, but heavy oil sheen observed south of debris removal. Extra booms added to contain sheen. Turbidity values ranged from 25-35 NTU at 50 ft from the debris removal activities with higher spikes of 50-60 NTU. Furthermore, a narrow turbidity plume from debris removal was detected out to approximately 700 ft. Turbidity elevations associated with dredge activities were 10-14 NTU at approximately 200 ft and dropped rapidly.
- **Exceedances and sample collections:** None.

September 11, 2007:

- **Tidal stage:** High tide at 8:19 and 20:39 EDT; low tide at 2:11 and 14:28 EDT.
- **Dredge activity:** Debris removal and dredging in Area G.
- **Monitoring activity:** Level I monitoring at dredge Area G. Monitored high, ebb, and flood tide.
- **Fishery and Wildlife Observations:** Several hundred dead fish were observed within and south of the dredge area. COE was notified of fish kill and corrective action was taken immediately, including cessation of debris removal activities and deployment of additional oil booms.
- **Results summary:** Very heavy oil sheen observed, possibly associated with debris removal. Localized low-level turbidity (10-15 NTU) observed south of dredge activities. Turbidity values ranged from 23-29 NTU at 75 ft from the debris removal and higher spikes of 59-60 NTU observed beyond 75 ft from debris removal activities. Dissolved oxygen levels in dredge Area G ranged from 1.4 to 2.8 mg/L.
- **Exceedances and sample collections:** No exceedances. Pre-planned, discrete water samples were collected for toxicity, TSS, turbidity, total and dissolved PCBs, and metals analyses based on a gradient of *in-situ* turbidity readings (low to higher concentrations).

September 12, 2007:

Area H

- **Tidal stage:** High tide at 8:59 and 21:17 EDT; low tide at 2:37 and 14:58 EDT.
- **Dredge activity:** Debris removal and dredging in Area H. No active dredging in the morning, dredge moved in Area G in the early morning.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** Occasional fish observed swimming at surface.



- **Results summary:** No oil sheen observed. Thin band of turbidity observed 15-40 NTU associated with debris removal, decreasing north to south. Dissolved oxygen values at the north and south moorings were around 3 mg/L.
- **Exceedances and sample collections:** None.

Area G

- **Tidal stage:** High tide at 8:59 and 21:17 EDT; low tide at 2:37 and 14:58 EDT.
- **Dredge activity:** Dredging in Area G in early morning.
- **Monitoring activity:** Level III monitoring at dredge Area G. Monitored flood tide.
- **Fishery and Wildlife Observations:** Sporadic fish swimming at surface, occasional dead fish observed.
- **Results summary:** No oil sheen observed with dredge removal. Turbidity values ranged from 4-8 NTU at 100 ft from the debris removal.
- **Exceedances and sample collections:** None.

September 14, 2007:

- **Tidal stage:** High tide at 10:16 and 22:31 EDT; low tide at 3:28 and 15:56 EDT.
- **Dredge activity:** Dredging in Area G.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored flood, high, and ebb tide.
- **Fishery and Wildlife Observations:** Large numbers of birds observed north of, within, and south of the dredge unit. Large numbers of fish were observed north of the bridge; many appeared strained. Low oxygen levels were measured in the area. Some dead fish were noted, but not in large numbers.
- **Results summary:** No oil sheen observed. Small turbidity plume associated with the dredge; values typically ranged from 15-25 NTU with occasional spikes to near 40 within 150 ft of dredge. Dissolved oxygen values in the overall area were low, ranging from 2.5 in the northern dredge area to 3.5 mg/L south of Area H. Oxygen values fell sharply at approximately 900' upstream from the Wood Street bridge to 1.5-1.8 mg/L.
- **Exceedances and sample collections:** None.

Week of September 17, 2007 (Week 7)

Slight elevated turbidity was observed in the area of the debris removal and dredge activities in Area H and Area G. No exceedances were observed, therefore, there were no sample collections driven by criteria exceedances. Oil sheen was observed in dredge Area G immediately after dredging operations had ceased on 9/19.

September 17, 2007:

- **Tidal stage:** High tide at 12:20 EDT; low tide at 5:01 and 17:42 EDT.
- **Dredge activity:** Debris removal in Area H. Dredging in Area G.
- **Monitoring activity:** Level III monitoring at dredge Area H and Area G. Monitored flood tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Large numbers of birds working above, within, and south of dredge Area G. Numerous fish observed north of Wood St. bridge.



- **Results summary:**
 - **Area H:** No oil sheen observed. Observed narrow plume on eastern shoreline. No exceedances, turbidity at 300 ft from debris removal ranged from 25-35 NTU. Turbidity values at the southern reference site were 2.5 NTU and at 200 ft from the debris removal activities was 45 NTU. Dissolved oxygen in this area (within and outside dredge Area H) ranged from 5 to 5.5 mg/L.
 - **Area G:** No oil sheen observed. Turbidity values were <20 NTU; at the reference site turbidity was 2.5 NTU and at 75 ft from the dredge activities was 15 NTU. Dissolved oxygen in dredge Area G ranged from 7.5 to 8.0 mg/L; north of Wood St. values dropped to approximately 3.5 mg/L.
- **Exceedances and sample collections:** None.

September 19, 2007:

- **Tidal stage:** High tide at 1:37 and 14:10 EDT; low tide at 6:29 and 19:28 EDT.
- **Dredge activity:** Dredging in Area G. Dredging was completed just prior to monitoring. Debris removal in Area H.
- **Monitoring activity:** Level III monitoring at dredge Area G and Area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Fish were observed in all areas north of Area H and within dredge Area H.
- **Results summary:**
 - **Area G:** Heavy oil sheen observed in area of southern boom inside the dredge boundary and a light sheen observed throughout the dredge area. No exceedances, turbidity observed in the central area of the dredge boundary were <20 NTU (range 16-18 NTU) and north of the dredge ranged from 30-40 NTU.
 - **Area H:** No oil sheen observed. No exceedances, turbidity at 50-100 ft south of the debris removal ranged from 16-22 NTU and 50-100 ft north of the debris removal ranged from 20-40 NTU.
- **Exceedances and sample collections:** None.

Week of September 24, 2007 (Week 8)

Slight elevated turbidity was observed in the area of the debris removal and dredge activities in Area H and Area G during monitoring on both days. No exceedances were observed, therefore, there were no sample collections driven by criteria exceedances. However, planned level II samples (TSS/Turbidity) were collected in Area H on 9/25/07.

September 24, 2007:

- **Tidal stage:** High tide at 6:25 and 18:47 EDT; low tide at 12:08 EDT.
- **Dredge activity:** Debris removal and dredging in Area H. Dredging in Area G.
- **Monitoring activity:** Level III monitoring at dredge Area H and Area G. Monitored ebb tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Occasional fish observed on surface in Area H and Area G.
- **Results summary:**
 - **Area H:** Slight sheen observed near dredge activities. High turbidity values observed close to the dredge and debris removal activities. The plume of turbidity



traveled south with the wind and tide. High turbidity associated with support vessel traffic due to low tide. Turbidity diminished away from sources and south of Area H boundary. Turbidity values observed at Area H boundary was 17 NTU, 75 ft south of debris removal was 122 NTU, and 100 ft south of debris removal was 88 NTU.

- **Area G:** No oil sheen observed. Dredge activity ceased due to low tide. No monitoring in the area.
- **Exceedances and sample collections:** None.

September 25, 2007:

- **Tidal stage:** High tide at 7:11 and 19:33 EDT; low tide at 0:37 and 13:00 EDT.
- **Dredge activity:** Debris removal and dredging in Area H. Dredging in Area G.
- **Monitoring activity:** Level II monitoring at dredge Area G and Area H. Monitored ebb tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Occasional fish observed on surface in Area H and Area G.
- **Results summary:**
 - **Area H:** Occasional oil sheen noted around dredge activities. Background turbidity observed in dredge and debris removal area ranged from 5-10 NTU. Turbidity readings above background confined to dredge path. Turbidity values 50 ft south of the dredge were 90-100 NTU, 75 ft south of the dredge were 55-65 NTU, and 100 ft south of the dredge were 10-20 NTU.
 - **Area G:** Slight oil sheen observed to the east and northeast of dredge. Dredge working very tight in northeast corner of dredge area. Higher turbidity concentrated to the northeast area with a slight sheen observed. Turbidity dropped off to background values of 6-10 NTU approximately 50 feet to the south and east of dredge activity.
- **Exceedances and sample collections:** No exceedances. TSS and turbidity samples collected during monitoring in Area H.

Week of October 1, 2007 (Week 9)

Monitoring focused on area H (no activity occurred in Area G). No turbidity exceedances were observed at 300 ft or 600 ft from dredge activity. Elevated turbidity readings were observed in close proximity (within 50 ft) of dredge activities in Area H however, readings diminished with distance from the dredge activities. Occasional oil sheen was observed on 10/3/07. Planned level I samples (toxicity, TSS/Turbidity, and total and dissolved PCBs) were collected in Area H on 10/3/07 adjacent to dredging activities, at 300 ft and at 600 ft from dredging activities.

October 1, 2007:

- **Tidal stage:** High tide at 12:06 EDT; low tide at 5:06 and 18:06 EDT.
- **Dredge activity:** Debris removal and dredging in Area H.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Many fish observed on surface in Area H.
- **Results summary:** No oil sheen observed. Turbidity ranges of 75-85 NTU were confined to within dredge area and in close proximity to debris removal. Short lived plumes of



turbidity (20-60 NTU) were observed north of dredge area and in close proximity to the dredge activities. Values dropped quickly to background levels. Dissolved oxygen levels ranged from 4.5-6 mg/L throughout the dredge area.

- **Exceedances and sample collections:** None.

October 2, 2007:

- **Tidal stage:** High tide at 0:34 and 13:08 EDT; low tide at 6:01 and 19:16 EDT.
- **Dredge activity:** Dredging in Area H.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Large schools of fish observed in all areas of the river and transiting though the dredge area.
- **Results summary:** No oil sheen observed. Turbidity values ranged between 10-70 NTU, which corresponded with dredge pass from east to west. Elevated turbidity (70 NTU) was observed in area of support vessels. Higher turbidity values dropped off quickly with distance from dredging activities. Dissolved oxygen values ranged from 9.21-13.73 mg/L both north and south of dredge area.
- **Exceedances and sample collections:** None.

October 3, 2007:

- **Tidal stage:** High tide at 1:39 and 14:14 EDT; low tide at 7:07 and 20:47 EDT.
- **Dredge activity:** Dredging in Area H.
- **Monitoring activity:** Level I monitoring at dredge Area H. Monitored flood tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Schools of fish observed within Area H and outside dredge area.
- **Results summary:** Occasional oil sheen noted around dredge activities. Turbidity readings in close proximity to dredge activities (approximately 50 ft) were 15-110 NTU. There was a broad range of turbidity readings due to stop and go dredge activities. These broad ranges continued but diminished with distance away from the dredge. Turbidity values 300 ft from the dredge were 11.6-20 NTU and 600 ft from dredge area were 11-13 NTU. Dissolved oxygen ranged from 6.84-11.91 mg/L within the northern area of the dredge boundary and north of the dredge boundary with a wide-range of turbidity readings (11-110 NTU). Dissolved oxygen readings south of the dredge area ranged between 9.65-14.6 mg/L with associated lower turbidity readings.
- **Exceedances and sample collections:** No exceedances. Collected toxicity, TSS, Turbidity, total and dissolved PCBs, and metals samples based on turbidity.

Week of October 8, 2007 (Week 10)

Dredging was limited to Area H. No turbidity exceedances were observed at 300 ft or 600 ft from dredge activity and no samples were collected. Elevated turbidity readings were observed in close proximity (within 50 ft) of dredge activities in Area H however, readings diminished with distance from the dredge activities. No debris removal occurred although the barge was present for dredge support on 10/9/07. Occasional oil sheen was observed on both days.

October 8, 2007:

- **Tidal stage:** High tide at 6:30 and 18:52 EDT; low tide at 0:42 and 13:03 EDT.
- **Dredge activity:** Dredging in Area H. No debris removal.



- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored Ebb tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Fish observed in all areas of the river and transiting through the dredge area.
- **Results summary:** Occasional oil sheen observed. Overall turbidity was low, ranging from 4-30 NTU within close proximity to dredge area, with an occasional spike to 50 NTU. Turbidity ranged from 3-17 NTU 50 ft from the dredge boundary. Values dropped to background levels (2.5-9.8 NTU) at 130 ft to 300 ft south of dredge area. Dissolved oxygen levels ranged from 3.5-4 mg/L throughout the dredge area and 3-6.6 mg/L outside the dredge area.
- **Exceedances and sample collections:** None.

October 9, 2007:

- **Tidal stage:** High tide at 7:12 and 19:32 EDT; low tide at 1:10 and 13:35 EDT.
- **Dredge activity:** Dredging in Area H. Debris removal barge present for support only.
- **Monitoring activity:** Level III monitoring at dredge Area H. Monitored ebb tide.
- **Fishery and Wildlife Observations:** No obstructions to fish passage observed. Occasional fish observed on the surface.
- **Results summary:** Occasional oil sheen observed. Crew did not enter dredge area due to close proximity of dredge debris removal barge and other support vessels. Highest turbidity levels (9-50 NTU) observed between 200 ft and 300 ft downstream of dredge activity. Values were dependent on dredge passage location. Turbidity values dropped off quickly at 300 ft from the dredge activity to just above background levels (4 NTU) with spikes to 26 NTU depending on dredge location. Dissolved oxygen values ranged from 5.5-6.4 mg/L within 300 ft from dredge activity.
- **Exceedances and sample collections:** None.



4.0 RESULTS

4.1 Dredging and Field Monitoring Summary

Dredging was conducted from mid-August to mid-October 2007. Dredging was initiated in Area H encompassing sections of DMU-9 and DMU-10, and DMU-11 and Area G, which encompasses sections of DMU-1 and DMU-102. The eastern portion of Area G (in DMU-102) is intertidal. As a result, dredging could not always be conducted in that area (dredge area G) during lower tides. To maintain efficiency a second dredge was set up. When low water prevented dredging in Area G, dredge crews moved over to the second dredge. This approach meant that the dredging location was variable from day to day and even within days. Dredging in Areas H and G was conducted in a North-South orientation during most of the dredging season. During the last two weeks of dredging in Area H, dredging was conducted East-West in the eastern portion of the dredge area only.

Once the dredge areas were determined, sheet piling was placed around the perimeter, at approximately 50 ft spacing. A perimeter cable was run around the sheet piles at approximately the high tide mark. Also along the perimeter, floating, absorbent oil booms were placed to contain any surface oil slicks. A 'gate' in the south end of the dredge area was used for all vessels entering or leaving the operation.

Dredging was performed using a Mud Cat™ hydraulic dredge equipped with a horizontal auger (Figure 9). The dredge was propelled by winching itself along a transverse cable which spans the dredge area to opposite sides of the perimeter cable. As a pass is completed, support crews relocated the cable to position for the next pass. Dredged material was pumped through a pipeline to a booster pump, then to the desanding facility at Sawyer Street. Following desanding, the remaining fine material was pumped via a separate pipeline to the dewatering, treatment, and handling facility in the Lower Harbor. In total, Jacobs estimated that dredging removed 23,300 cubic yards of material in 2007.



Figure 9. Mud Cat™ Hydraulic Dredge

Because hydraulic dredges can not process large debris it was necessary to conduct separate removal operations prior to the dredging of a particular area. Debris removal was accomplished by 'raking' the bottom with a barge-mounted excavator (Figure 10). The end of the excavator has two forked jaws that open and close. The jaws are deployed to the bottom, once on the bottom the two jaws scrape the bottom and then close into each other and capture the debris. Debris scows secured to the side of the debris removal platform stored the debris and were moved offsite as needed. Support boats were used throughout the operation to transport crews, maintain dredges, handle the pipeline, and move barges.



Water quality monitoring was conducted in an adaptive manner in response to changing operational and weather related conditions. The monitoring approach was modified as tides and winds changed; as dredges changed areas; as debris removal activities changed; and as warranted based on support activities. The monitoring activities were also largely influenced by tidal conditions and safety. The dredge areas and the associated perimeter cable spanned most of the width of the river limiting access to northern portions of the river, including potential reference locations. Only at high tide was the east side of the river passable. At low tides it was often possible to pass under the perimeter cable, but sampling time was limited. All of these activities (dredging, debris removal, and support activities) had the potential to impact water quality. The monitoring program incorporated assessment of the entire operation.



Figure 10. Debris Removal Excavator

4.2 Boat-based Measurements and Sample Collection

Boat-based monitoring followed the protocols outlined in Sections 2.1 and 2.2. Under these protocols the sampling teams functioned in an adaptive sampling mode, utilizing real-time *in situ* data to guide monitoring and sample collection. Depending on the objectives for each survey day, the real-time data either supported a criteria-based sampling approach (Figure 5) or guided the planned collection of water samples. Because no water quality exceedances of the established monitoring thresholds were identified at the 600-ft transect throughout the entire 2007 dredge season, no criteria-based samples were collected. However, non-exceedance data gathered within the 600-ft project boundary provides valuable information as to the potential effects of dredging and related activities on water quality during dredge operations. This is discussed further in Section 5. The results below describe the discrete sampling activities by collection date. Results of chemical and biological testing are provided in Section 4.4.

Water samples were collected either to establish baseline conditions and/or re-establish relationships between field measurements (i.e. turbidity) and toxicity results to verify the protectiveness of the 50 NTU criteria. No samples were collected in response to an exceedance of the 50 NTU turbidity criteria at the 600-ft transect. Water samples were collected for turbidity and TSS analyses on six occasions during the dredge season as detailed in the following paragraph. During three of these events samples were also collected for PCB and toxicity testing (Table 1). Metals samples were collected during four of the sampling events and were archived for potential analysis. None of the metals samples required analysis based on results of the other monitoring results.

The first sampling event was conducted on August 9, 2007 following Level I protocol (turbidity, TSS, PCBs, toxicity, and metals testing) during dredging and debris removal activities in Area H.



Four samples were collected: one reference sample, collected approximately 1,000 ft south of the dredging operations; one sample targeting the 55-60 NTU range, collected within approximately 100-150 ft from debris removal activity occurring on-site; and two samples targeting an intermediate turbidity (10-30 NTU), collected less than 300 ft south of the Area H dredge boundary.

The second sampling event was conducted on August 16, 2007 in response to observance of elevated turbidity plumes in Area G during debris removal activities (though below the 50 NTU at 300 ft criteria). Level II protocols were followed and four samples were collected for turbidity, TSS, and metals: one reference sample, collected at the Wood St. Bridge reference site; one sample collected 200 ft south of the debris removal; one sample from the Area G dredge boundary; and one sample collected 300 ft south of the Area G dredge boundary.

The third sampling event was conducted on August 29, 2007 during debris removal activities conducted at Area G. Level II protocols were followed and four samples were collected for turbidity and TSS analysis only: one sample was collected at the Wood St. Bridge reference site; one sample 75 ft from the debris removal activity; one sample at the Area G dredge boundary; and one sample 300 ft from the Area G dredge boundary.

The fourth sampling event was conducted on September 11, 2007 during dredging and debris removal activities at Area G. Level I protocols were followed and three samples were collected for the full suite of analyses. While unacceptable turbidity levels were not observed at the predefined boundary locations, the sampling team collected samples from a reference area and locations with higher turbidity close to the operations to evaluate turbidity/toxicity relationships and levels of protection. The reference sample was collected at the Wood St. Bridge, north of dredging activities. The other two samples were collected within 300 ft of dredging and debris removal activities; samples were collected from two turbidity ranges (23-29 NTU and 59-60 NTU). The team also observed several hundred dead fish south of dredge Area G. Dissolved oxygen readings in the survey area measured during this period ranged between 1.47 to 2.75 mg/L. COE was notified of fish kill and corrective action was taken immediately, including cessation of debris removal activities and deployment of additional oil booms.

The fifth sampling event was conducted at Area H on September 25, 2007 following Level II protocols. Three samples were collected for analysis of turbidity and TSS only, across a range of turbidity levels to generate a correlation curve of *in situ* turbidity readings to TSS values. Samples were collected in Area H, at locations targeting 10-20 NTU, 55-65 NTU, and 90-100 NTU during dredging activities.

The final sampling event was conducted on October 3, 2007 during dredging at Area H. Level I protocols were followed and three samples were collected for the full suite of analyses: one sample was collected approximately 50 ft, 300 ft, and 600 ft north of the dredge activities during the flood tide. Relatively low turbidity was measured in samples collected at all locations.

4.3 Continuous *In Situ* Data

The deployment of the continuously recording water quality sensors provided additional information that complimented the adaptive monitoring approach discussed above. The location of sensors both north and south of the dredge areas provides information regarding tidal



influences on sediment suspension and transport. The moorings were located between the 300 and 600 foot boundary lines of the active dredging area. Continuous readings provided water quality data for periods when adaptive sampling was not performed, such as inactive dredge periods (nights and weekends), thereby providing background condition for data comparison. Dredging operations frequently stopped and started due to mechanical or physical issues and the location of activities was highly variable. As a result, it is not always possible to ascertain how specific time periods in the continuous record relate to dredge activities. However, since no dredging took place on nights or weekends it is appropriate to use these time periods to define ‘inactivity’ and to use daytime to define ‘activity’ of the dredging operation. In this way, it is possible to distinguish dredging related water characteristics from background conditions. Appendix B provides plots of turbidity at both locations for the entire monitoring period. Additionally, these figures indicate tidal cycles and highlight nighttime and weekend periods. Individual examples are provided along with the results below.

In the discussion below and in the figures provided in Appendix B, a horizontal red line is indicated on each plot representing 50 NTU. A water quality criterion for the New Bedford Harbor Environmental Monitoring program has been established at 50 NTU above background, or natural turbidity. The background turbidity signal in the river is influenced by tidal conditions, stream flow, wind, and other factors. As a result the background turbidity signal can fluctuate on scales from minutes to days. In general, the background turbidity signal was between 3 and 20 NTU. Background values have NOT been removed from the continuous data presented in the following figures. As a result, the 50 NTU line should be viewed strictly as a guideline. For example, a value of 50 NTU represents a turbidity reading that is typically 40-47 NTU above background.

Turbidity signals related to dredge activity were clearly observed in the continuous *in situ* data. These signals manifest as peaks in turbidity above background. Figure 11 and Figure 12 in this section are provided as examples of these effects. The influences of tidal height and flow direction on sediment plume transport are also evident in these figures. Figure 11 shows the turbidity record from both moorings during Week 1 of dredging, including the following weekend. Nights and weekends are shaded on the figure to indicate periods of inactivity in the dredging operation. The following details water quality characteristics observed in the continuous record during this first week of dredging. The letters below correspond to the letters shown on Figure 11.

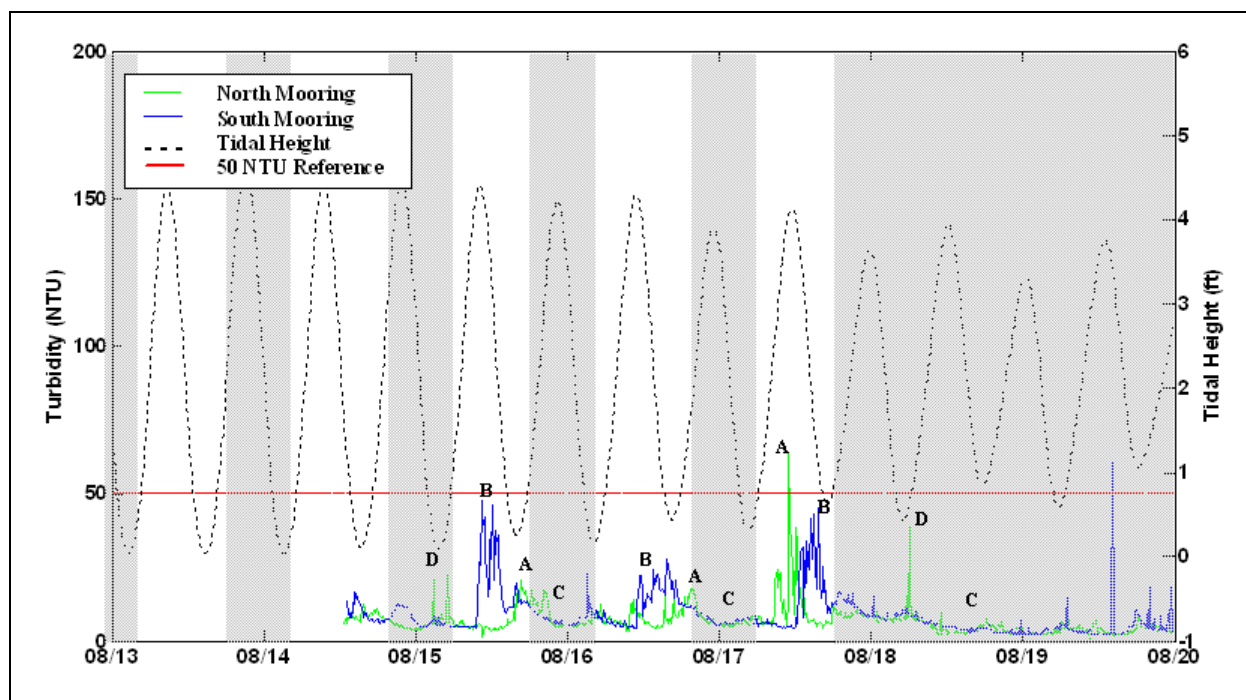
- A.** On an incoming tide, current flow is predominately towards the north. As a result, any suspended sediment plumes related to dredging would be expected to be evident at the northern mooring and would not be expected at the southern mooring. This was observed to some extent on all three days with active dredge (8/15-8/17) where, during the rising tide, the northern turbidity was greater than the southern turbidity (labeled ‘A’). The peaks observed on August 17, 2007 provide the clearest example of this, as dredging operations were active for a complete tide cycle. Note that the YSI was set to take a thirty second sample every 10 minutes.
- B.** During the outgoing tide, the effect is reversed so that the southern mooring registers a turbidity peak (‘B’) while the turbidity measured at the northern mooring returns to background.



- C. Weak turbidity peaks seen on days with no dredging activities (8/18-8/19) are indicative of background levels of turbidity. They generally occur at low tide and may be indicative of more turbid outgoing river water or they may be a result of the fact that the sensor is nearer the bottom during low tide where any naturally occurring sediment resuspension is most evident.
- D. Throughout the record, occasional spurious readings are evident (narrow peaks such as the >50 NTU reading on 8/19). These are typically a single reading caused by momentary blockage of the turbidity sensor and do not indicate actual water column turbidity.

The correlation between low tide and background peaks in turbidity was occasionally very strong. This was true during extreme astronomical tides during the week of August 27, 2007. Figure 12 shows the effect of the exceptionally low tides on the turbidity signal at both moorings. Note that even during periods of no dredge activity (nights and weekend) high turbidity signals were observed during the low tides. Available weather data was reviewed for this time period, however, no apparent correlations existed between wind or precipitation and turbidity.

The 2007 dredge plan encompassed two geographic areas. These areas were active at various times during any given week as tides and other factors dictated. On occasions, the dredge would be working in one area while the debris removal was in the other area. When tides were below working conditions in the northern area, the dredge would work in the southern area. As a result, it is somewhat difficult to assess the location of dredging activities relative to particular data points in the continuous record. However, since the debris removal was active during August 16, 2007 in the southern area at high tide, and the dredge was not, it is reasonable to conclude that the relatively large plume observed by the south mooring that day was caused by the debris removal. Large turbidity plumes were also observed on October 8 and 9, 2007 at low tide in the southern section of Area H, however the debris removal barge was not operational, and only the dredge was in use. On September 14, 2007, the debris removal was not active, and the dredge crew was actively working in the northern area, however no apparent plume was observed (high tide). This indicates that both the debris removal and the dredge/support boats at times create significant turbidity plumes.



* Letters Correspond to Text.

Figure 11. Example of Turbidity Signals Related to Dredging and Tidal Direction, August 2007 (shaded areas indicate nights and weekends).

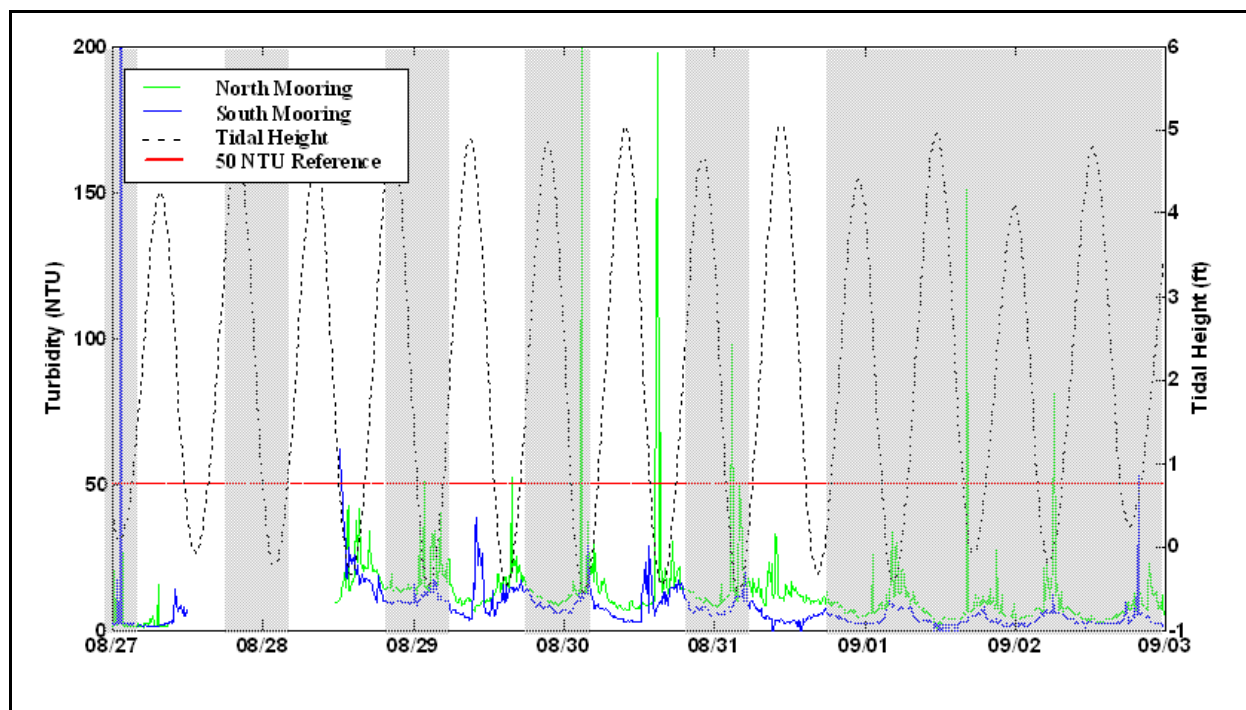


Figure 12. Example of Turbidity Signals Related to Extreme Low Tides, August and September 2007 (shaded areas indicate nights and weekends).



Continuous *in-situ* dissolved oxygen data were collected at both moorings throughout the majority of the deployments (Figure 13). Dissolved oxygen readings were typically higher during midday and decreased at night and throughout the early morning. The lowest dissolved oxygen readings recorded at the north and south moorings occurred early in the week of September 9, 2007 (Figure 13). Midday readings increased to approximately 5 mg/L, and the overnight readings decreased to approximately 2 mg/L. The low dissolved oxygen readings that occurred for 2-3 days, may have contributed to the fish kill that was observed on September 11, 2007 (see Section 5.1).

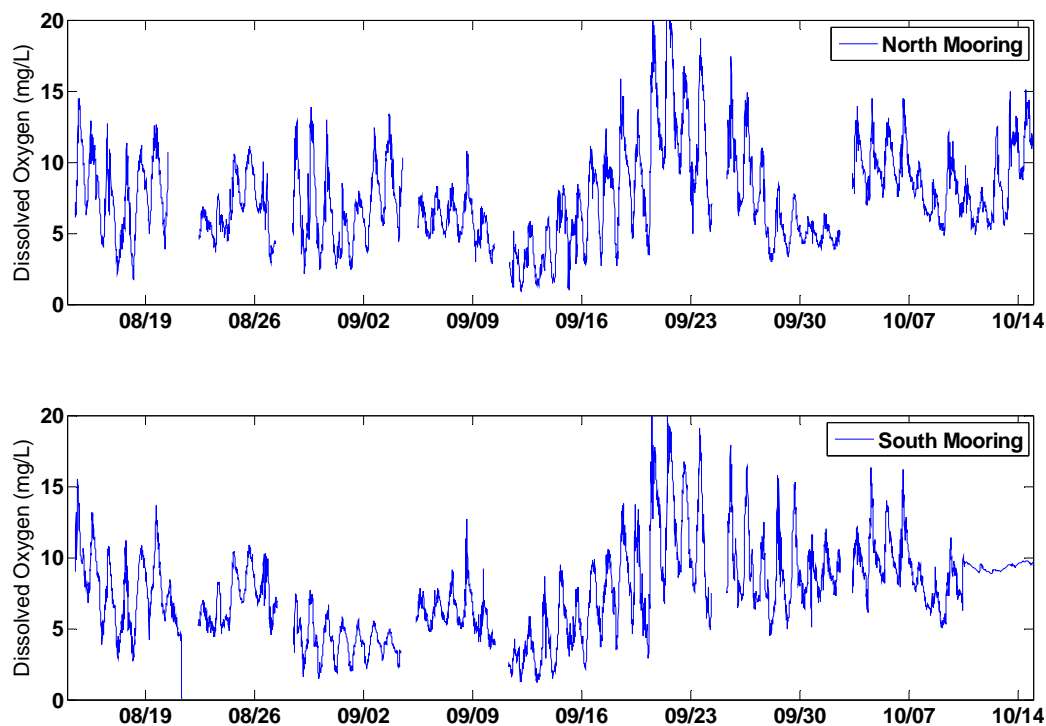


Figure 13. Continuous Dissolved Oxygen Data at the North and South Moorings, August to October, 2007.



4.4 Analysis of Discrete Water Samples

4.4.1 TSS/Turbidity Analyses

TSS and turbidity results for discrete water samples collected during the 2007 monitoring season are presented in Table 3. Field-based, *in-situ* turbidity data are also reported in Table 3 for comparison to the lab-based results. TSS and turbidity samples were collected based on distance from the dredging operation or debris removal (e.g., Reference, Boundary, 300 ft from Dredge Boundary, 200 ft from Debris Removal) and targeted turbidity levels (e.g., 13 NTU, 60 NTU).

In the field samples, TSS results ranged from 10.3 mg/L to 227 mg/L and turbidity results ranged from 4.6 NTU to 108 NTU. Samples collected from reference sites, which were generally located 1000 ft south or north of the dredging operation, showed relatively low TSS and turbidity measurements. TSS and turbidity values decreased with distance from the dredging operation (Table 3 and Figure 14). The highest TSS and turbidity values were observed in samples collected to target specific turbidity ranges (e.g., WQ-TSS/TUR-001-092507, WQ-TSS/TUR-002-092507). These samples were collected to confirm relationship between turbidity, TSS, PCB, and toxicity as described in Section 2.1.

In addition, an equipment blank sample (WQ-TSS/TUR-005-081607-EB) was collected on August 16, 2007. The TSS and turbidity values in the equipment blank were approximately an order of magnitude lower than the lowest values observed in the field samples, indicating minimal impact of equipment and sampling procedure contamination on the field sample data. Furthermore, four field duplicate samples were collected during the dredge season. The results from the duplicate samples were similar to the sample results for both TSS and Turbidity with exception of a TSS sample collected on September 11, 2007. The duplicate TSS sample value was four times higher than the initial sample collected.

4.4.2 PCB Analyses

PCB results are presented in Table 4. Water samples for PCB analysis were collected during three of the six sampling events. Ten water samples, plus two field duplicates were analyzed for total (dissolved + particulate) PCBs (sample ID with prefix “WQ-TPC”) and dissolved PCBs (sample ID with prefix “WQ-DPC”). One equipment blank sample was collected and analyzed for total PCBs.

The sum of 18 NS&T congeners (referred to as “SUM 18 CONG” in the text) for all the collected water samples are presented in Table 4. Because no appropriate multiplier is available from previous studies to correlate SUM 18 CONG to total PCB concentration in the water samples of the New Bedford Harbor, SUM 18 CONG is used in this report as an indicator of the relative level of PCB contamination in the water samples. Note that SUM 18 CONG only represents a fraction of the total PCB concentration in the water samples. The detailed analytical results of the water samples, including the concentrations for individual 18 congeners, as well as SUM 18 CONG, are presented in Appendix C. The SUM 18 CONG ranges from 0.25 µg/L to 24 µg/L in the total (dissolved + particulate) water samples, and from 0.12 µg/L to 1.7 µg/L in the dissolved phase samples (Table 4).



Table 3. Summary of TSS and Turbidity Results

Date	Sample ID	Sample Description ¹	Lab-based		Field-based, <i>in-situ</i> reading
			TSS (mg/L)	Turbidity (NTU)	Turbidity (NTU)
8/9/07	WQ-TSS/TUR-001-080907	Mid-Reference-Area H	10.5	4.6	2.2
8/9/07	WQ- TSS/TUR -002-080907	13 NTU-Area H	31.5	18	13.2
8/9/07	WQ- TSS/TUR -003-080907	20 NTU-Area H	40.7	24	19.6
8/9/07	WQ- TSS/TUR -004-080907	55 NTU-Area H	117	63	~55 ²
8/16/07	WQ- TSS/TUR -001-081607	Wood St. Reference-Area G	18.7	8.65	5.8
8/16/07	WQ- TSS/TUR -002-081607	200 ft from Debris Removal-Area G	26	14.7	16
8/16/07	WQ- TSS/TUR -003-081607	Dredge Boundary-Area G	24.5	12.4	11.1
8/16/07	WQ- TSS/TUR -004-081607	300 ft S of Dredge Boundary-Area G	10.5	5.14	3.4
8/29/07	WQ- TSS/TUR -001-082907-DUP	Wood St. Reference-Area G	27	12.3	9.1
8/29/07	WQ- TSS/TUR -001-082907	Wood St. Reference-Area G	24	12.1	9.1
8/29/07	WQ- TSS/TUR -002-082907	75 ft from Debris Removal-Area G	57	32.9	30.5
8/29/07	WQ- TSS/TUR -003-082907	Dredge Boundary-Area G	23.5	13.4	17.2
8/29/07	WQ- TSS/TUR -004-082907	300 ft from Dredge Boundary-Area G	24	18.4	16.7
9/11/07	WQ- TSS/TUR -001-091107	Wood St. Reference-Area G	10.3	5.91	4.9
9/11/07	WQ- TSS/TUR -001-091107-DUP	Wood St. Reference-Area G	43.8	6.04	4.9
9/11/07	WQ- TSS/TUR -002-091107	23 NTU, 75 ft from Debris Removal-Area G	41	19.2	23-29 ²
9/11/07	WQ- TSS/TUR -003-091107	60 NTU-Area G	129	52	59-60 ²
9/25/07	WQ- TSS/TUR -001-092507	55 NTU-75 ft S of Dredge-Area H	188	63.8	57.6
9/25/07	WQ- TSS/TUR -002-092507	90 NTU-50 ft S of Dredge-Area H	227	108	94.6
9/25/07	WQ- TSS/TUR -003-092507	10 NTU-100 ft S of Dredge-Area H	27.5	13.8	13.2
9/25/07	WQ- TSS/TUR -003-092507-DUP	10 NTU-100 ft S of Dredge-Area H	34.5	12.4	13.2
10/3/07	WQ- TSS/TUR -001-100307	50 ft N of Dredge-Area H	144	71.6	65-100 ²
10/3/07	WQ- TSS/TUR -002-100307	300 ft N of Dredge-Area H	34.3	15.5	13-20 ²
10/3/07	WQ- TSS/TUR -002-100307-DUP	300 ft N of Dredge-Area H	28.5	16.7	13-20 ²
10/3/07	WQ- TSS/TUR -003-100307	600 ft N of Dredge-Area H	19	14	11-13 ²
8/16/07	WQ- TSS/TUR -005-081607-EB	Equipment Blank	1	0.4	NA

¹ Samples are collected either based on distance (e.g., 300 ft from Dredge Boundary, 200 ft from Debris Removal) or Turbidity levels (e.g., 13 NTU, 60 NTU), see Section 2.1 for further discussion on Sample Location.

² *In situ* readings were erratic and varied during sample collection

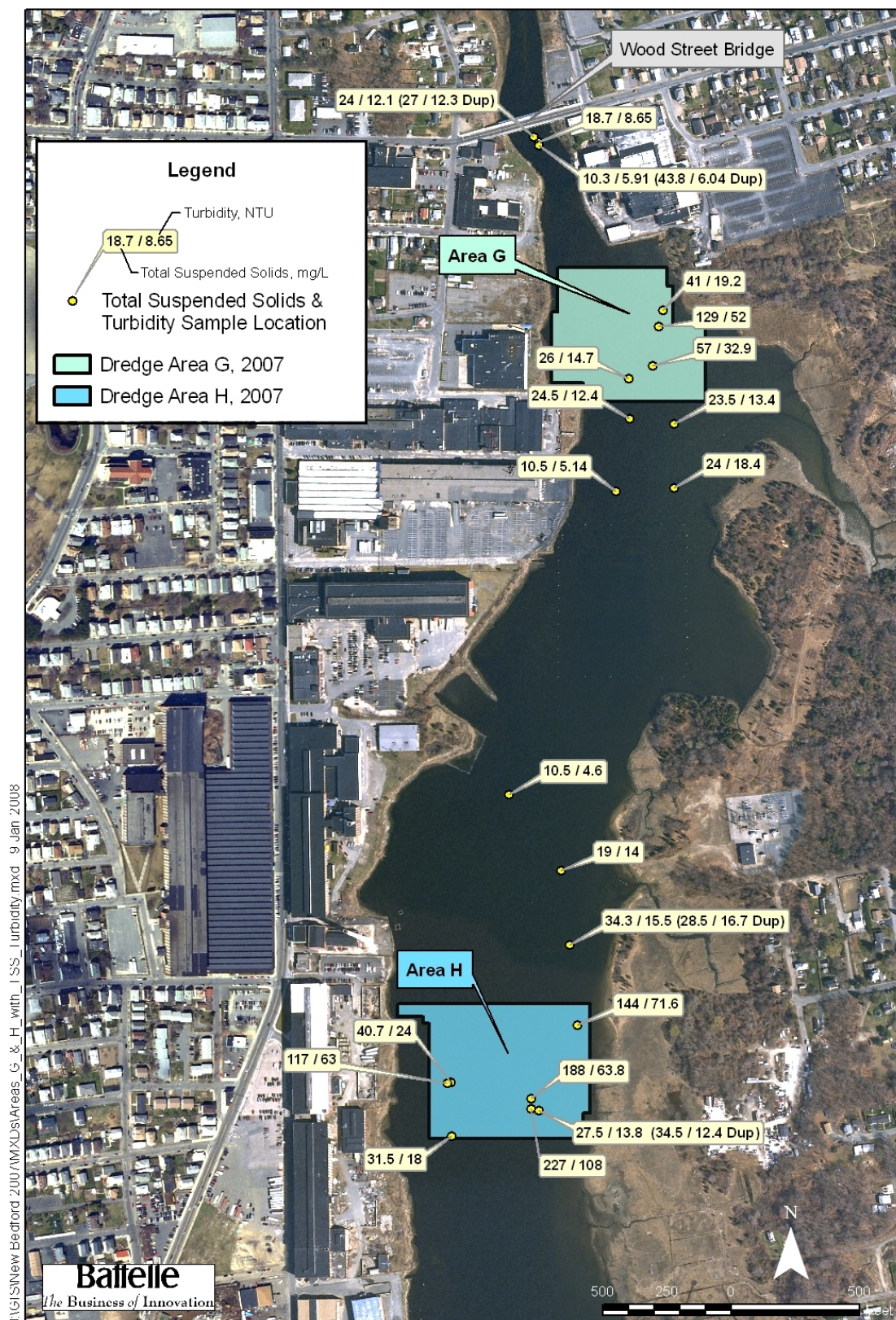


Figure 14. TSS and Turbidity Results.



The concentration of PCBs (SUM 18 CONG) measured in the equipment blank (WQ-TPC-004-091107-EB) collected on September 11, 2007 is 0.015 µg/L, which is one or more orders of magnitude lower compared to the field samples. This indicates that the equipment and sampling procedure contamination, if any, had minimal impact on the field sample data quality. Furthermore, the results from the two duplicate samples were similar to the initial sample results.

4.4.3 Toxicity Analyses

Toxicity samples were collected following Level I protocols during 3 of the 6 sampling events (Table 1), resulting in a total of 10 samples for biological testing. All toxicity samples were collected in support of pre-planned sampling events; none were triggered by turbidity exceedances. Each sampling event included an upstream reference sample and testing included a laboratory control sample. Results for test endpoints for each sample were statistically compared to those from both the event-specific site reference sample and the laboratory control. Toxicity results, including a summary of survival, growth, development and reproduction endpoints and associated statistical analyses for all tests conducted, are presented in Table 4. Supporting data, including laboratory bench sheets, water quality data, statistical analyses and custody forms are provided in Appendix D. Review of reference toxicant data associated with the tests showed all results within the acceptable ranges.

4.4.3.1 Sea Urchin (*Arbacia punctulata*)

1-hr sperm cell fertilization – Percent fertilization was greater than 90% for all but two samples, and one of those was the control for the September 11, 2007 tests. Statistically, percent fertilization was never significantly lower than the laboratory control sample, however, two samples exhibited statistically significantly lower percent fertilization than the site-specific reference samples. Percent fertilization was consistently high (> 85%) indicating that while some impact relative to the reference samples was observed, the impact was relatively small.

4.4.3.2 Mysid (*Americamysis bahia*)

48-hr survival – All 10 samples tested for mysid 48-hr survival were within 5% of the laboratory controls and overall survival was excellent.

7-day mean survival - All but one of the samples tested for mysid 7-day survival were within 5% of the laboratory controls. Only one sample, the 59-60 NTU sample collected on September 11, 2007, showed significant reduction in survival compared to both the laboratory control and the site reference sample. This sample contained the highest dissolved and whole water PCB concentrations collected during the monitoring period.

7-day mean growth – mean growth ranged from 0.09 to 0.58 mg/mysid. Growth was similar to/or greater than the laboratory control and site reference for all but three samples tested. Only one sample showed statistically significantly reduced growth relative to the laboratory control while all three showed reduced growth relative to the site specific reference samples.



4.4.3.3 Red alga (*Champia parvula*)

48-hr mean survival – All samples showed 100% survival indicating no acute impact to the alga.

7-day mean reproduction – *Champia* reproduction, measured as the number of cystocarps produced, was found to be statistically reduced in 5 of the 10 site samples tested. All five of these samples showed reduced reproduction relative to the laboratory controls and three of these samples also showed reduced reproduction relative to the site reference samples. In general, reduced reproduction was found associated with samples of higher turbidity or those samples collected closest to the dredging activities. Cystocarp production in the site sample collected within 50 feet of dredging activities on October 3, 2007, showed no cystocarp production at all.

Table 4. Summary of TSS, Turbidity, PCB, and Toxicity

Dredge Area and Sample Date	Estimated Distance from Dredge (ft)	Sample Description ¹	TSS (mg/L)	Turbidity (NTU)	Total PCB ² Results (µg/L)		Toxicity Results					
							Sea Urchin (<i>A. punctulata</i>)	Mysid (<i>A. bahia</i>)			Red alga (<i>C. parvula</i>)	
					Total	Dissolved	mean fertilization (%)	48-hr mean survival (%)	7-day mean survival (%)	7-day mean growth (mg/mysid)	48-hr mean survival (%)	7-day mean reproduction (cystocarp/tip)
Area H 8/09/07	N/A	Lab Control	N/A	N/A	N/A	N/A	96.9	92.5	92.5	0.350	100	38.6
	1000-1100	Reference	10.5	4.6	0.31	0.17	97.3	97.5	97.5	0.473	100	34.2
	500	13 NTU	31.5	18	0.28	0.12	96.7	97.5	97.5	0.423	100	19.5 ^{3,4}
	200	20 NTU	40.7	24	0.25	0.14	97.8	97.5	95.0	0.436	100	40.4
	200	55 NTU	117	63	0.32	0.17	95.0	97.5	95.0	0.372 ⁴	100	24.4 ³
Area G 9/11/07	N/A	Lab Control	N/A	N/A	N/A	N/A	86.3	100	100	0.278	100	19.0
	570	Reference	10.3 (43.8 ⁵)	5.91 (6.04 ⁵)	2 (1.5 ⁵)	1.1 (0.91 ⁵)	92.7	100	98.8	0.322	100	20.8
	75	23-29 NTU	41	19.2	5.9	1.5	94.1	100	98.8	0.283 ⁴	100	27.4
	140	59-60 NTU	129	52	24	1.7	84.8 ⁴	100	45 ^{3,4}	0.090 ^{3,4}	100	5.45 ^{3,4}
Area H 10/03/07	N/A	Lab Control	N/A	N/A	N/A	N/A	93.2	97.5	97.5	0.352	100	16.55
	50	50 ft.	144	71.6	8.2	1	94.7	100	100	0.580	100	0 ^{3,4}
	300	300 ft.	34.3 (28.5 ⁵)	15.5 (16.7 ⁵)	1.7 (1.9 ⁵)	1.7 (0.75 ⁵)	92.3 ⁴	100	97.5	0.431	100	9.65 ³
	600	600 ft.	19	14	1.8	0.68	95.5	100	100	0.415	100	11.4
	N/A	Equipment Blank	1	0.4	0.015	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A – Not Applicable

¹ Samples are collected either based on distance (e.g., 300 ft from Dredge Boundary, 200 ft from Debris Removal) or Turbidity levels (e.g., 13 NTU, 60 NTU), see Section 2.1 for further discussion on Sample Location.

² Sum of 18 NS&T congeners.

³ **Bold values** are significantly different from associated laboratory control sample.

⁴ **Bold values** are significantly different from associated reference sample.

⁵ Replicate value.





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5.0 DISCUSSION

The field monitoring program was designed to assess the potential impacts of dredging on water quality with an ultimate goal of minimizing harm to biological components of the system. To achieve that goal the monitoring was carried out in several ways;

- Adaptive *in situ* monitoring was used to track sediment plumes in real-time. This design allowed for immediate feedback to the dredging operation so that potential issues could be addressed before ecological harm was incurred.
- Pre-defined sampling provided guidelines for collection of analytical samples. The results of these analyses provide critical data regarding the chemical and biological impacts of dredging related activities on the system.
- Continuous data collection provided long-term information during periods when human-based sampling was not possible and when potential anthropogenic disturbances to the systems were minimal.
- Observational monitoring was conducted during all aspects of the program. This included anecdotal observations of fish passage and behavior, and observations of non-targeted parameters such as oil sheens and air quality. Like the adaptive *in situ* monitoring, observational monitoring provides rapid feedback to managers and operators and can help to minimize ecological risk.

5.1 Fishery and Wildlife Observations

Information pertaining to fish passage and behavior are based on visual observations recorded by field staff throughout the 2007 monitoring season. Throughout the dredge season large numbers of fish were observed in the study area. Lower trophic level baitfish were consistently observed moving throughout the river from Sawyer St. to Wood Street. Larger predatory fish such as striped bass and bluefish were also sporadically seen. Heron, egret, and other wading birds were observed feeding along the shoreline during these weeks. Terns, cormorants, and gulls were seen in fairly large numbers as well (Figure 15). During this time period, when fish were most abundant, there appeared to be no restriction of movement past the dredge area.



Figure 15. A Flock of Seagulls Observed in Area of Dredging Operations.



During the water quality monitoring, sporadic dead fish were observed in the dredge areas. On September 11, 2007, several hundred dead fish were observed south of dredge Area G and corrective action was taken as described in Section 3.0. Dissolved oxygen readings at Area G measured during this period ranged between 1.47 to 2.75 mg/L. While sensitivity to low levels of dissolved oxygen is species specific, most species of fish are distressed when levels decrease to 2-4 mg/L and mortality usually occurs at levels below 2 mg/L. The dissolved oxygen level and duration of the oxygen depletion event will impact the number of fish that can die. Larger fish are usually impacted by low dissolved oxygen before smaller fish (<http://edis.ifas.ufl.edu/FA002>). Approximately 10 days after the fish kill on September 11, 2007, the dissolved oxygen readings increased to above 15 mg/L (Figure 13). Based on routine observations dredging operations did not appear to impact fish passage.

5.2 Suspended Sediment and Sediment Transport from Dredging Activities

As in previous years a project-specific warning level of 50 NTUs above background 300 ft down current of dredging operations was set as a threshold for sample collection and assessment of operations. A project criterion of 50 NTUs above background at 600 ft down current was set as a threshold for immediate cessation of operations related to the exceedance. During the 2007 dredge season there were no exceedances of either the warning level or the project turbidity criterion.

During operations there were three general activities with potential to generate suspended sediment plumes; 1) dredging, 2) debris removal, and 3) support activities. Dredging itself created virtually no measurable sediment plumes. When safety allowed, the monitoring team worked in tight radiuses (<30 ft) around the active dredges. Debris removal generated the most consistent suspended sediment plumes. The act of ‘raking’ the bottom generated smaller plumes that tended to settle quickly. The largest impacts were associated with pulling the equipment (with or without debris) up through the water column (Figure 16). As sediment cascaded off of the equipment, sediment plumes could be seen down current. This was particularly true for the sediment fractions which were often observed in the upper water column (above the halocline) for extended periods and distances. Because the sampling effort was targeting areas of elevated turbidity, some of the water quality monitoring was focused around debris removal activities. Support activities included transport of people and gear, dredge maintenance, and moving of debris removal equipment both on routine basis and as a result of inclement weather. This last activity required greater propeller power from the larger boats and was the only support activity which tended to re-suspend sediments. This was generally only a problem at low tide when prop wash reached the bottom. While this was an infrequent problem it tended to generate the largest, most sustained turbidity plumes.

Turbidity plumes generated by all activities tended to be extremely short lived, both spatially and temporally. Suspended sediment plumes related to debris removal tended to be pulsed in nature. For example, monitoring crews would conduct radial transects around the operation at approximately 100 ft. When the debris removal bucket would come up through the water column turbidity would quickly begin to increase. Sensors towed from the bow of the boat at slow speeds (<2 knots) were used to obtain real-time readings to track the movement of the plume away from the source towards the criterion boundaries. In general, turbidity would drop back down to background levels well before the 300 ft line was reached. In cases where elevated turbidity persisted out towards the boundary, the readings would generally persist for less than 5-



10 minutes. Even within close proximity to operations, the plumes tended to be of short duration. A good example of this was observed on August 9, 2007. On this date, sampling crews targeted elevated turbidity for sample collection, and operated in close proximity to the dredge and debris removal to find high values. One sample was collected within 50 ft and two samples were collected within 100 ft south of the dredge and debris removal activities. The first sample was collected in a high turbidity (55-60 NTU) condition with final TSS concentrations of 117 mg/L. In the two samples that were collected within 100 ft of the dredge and debris removal activities, the turbidity values decreased to 13-20 NTU and TSS values were an order of magnitude lower (30-40 mg/L). In an effort to characterize the toxicity effect of elevated turbidity (discussed previously) the team attempted to target the high NTU areas for discrete sample collection. However, this sampling effort proved to be fairly difficult as turbidity plumes did not usually persist for long enough to collect a full suite of discrete samples.



Figure 16. Debris Removal Generated the Majority of Turbidity Plumes

The short term, pulsed nature of the suspended sediment plumes is also observed in the continuous *in situ* data record (Figures 11 and 12). Turbidity peaks at the northern and southern mooring locations between the 300 ft and 600 ft lines were always below 50 NTU when compared to background. On an incoming tide, current flow is predominately towards the north and as a result, any suspended sediment plumes related to dredging was observed at the northern mooring. During the outgoing tide, the effect was reversed so that any suspended sediment plumes were observed at the southern mooring. Weak turbidity peaks seen on days with no dredging activities are indicative of background levels of turbidity. They generally occur at low tide and may be indicative of more turbid outgoing river water or they may be a result of the fact that the sensor was nearer the bottom during low tide where any naturally occurring sediment resuspension is most evident. Individual spikes are visible in the record above 50 NTU, but as discussed earlier, these are spurious single readings caused by momentary blockage of the turbidity sensor and not representative of water column turbidity. The only extended periods of



elevated turbidity occurred during extreme low tides. However, comparable signals were seen during inactive dredge periods.

As noted in the 2006 Water Quality Monitoring report (Battelle, 2007), one of the more subtle characteristics of sediment transport observed during the monitoring period was the tendency for very fine sediments to become entrained in the upper water column. This was first observed visually during the monitoring program. Sampling crews observed ‘clouds’ of fine sediment and targeted these features for *in situ* readings. This revealed a thin layer of elevated turbidity associated with the low salinity surface water. Immediately below this layer turbidity declined to background levels. The lighter surface layer usually only represented about the upper one foot of the water column. The elevated turbidity associated with this layer was often even thinner, comprising only a few inches resting on top of the sharp density gradient. This may have been caused by shear in the water column where the surface layer was moving in a different direction or at a different speed than the bottom layer. Alternatively, the estuarine turbidity maximum (ETM) is a common property of estuaries resulting as tidal water moves upriver creating turbulence and resuspending sediments from the bottom while particulates in the outflowing river are trapped against the density gradient, adding to the turbidity levels. Additionally, as the freshwater contacts the more saline water dissolved material can flocculate creating more particulates which add to the turbidity levels. In either case, turbidity readings in these surface layers were generally only about 15-30 NTU, well below the warning criterion, but at times these levels persisted for several hundred feet away from the source.

5.3 Impacts to the Water Column

As expected, turbidity correlated well with TSS ($R^2 = 0.9367$) in the two dredging areas (Figure 17). Samples collected from Area G (Figure 18) showed better correlation between total PCB (as SUM 18 CONG) and TSS, and thus with turbidity, than the samples from Area H (Figure 19). This may be an indication of different levels of PCB contamination in the sediments from the two dredging areas. Resuspended sediments from Area G may be relatively contaminated, resulting in the total PCB increase with TSS (Figure 18). On the other hand, Area H sediment may be less contaminated, and therefore a TSS and total PCB correlation was not apparent in the water samples from the area (Figure 19). As observed in the 2006 Water Quality Monitoring program, dissolved PCB concentrations were generally low and did not correlate well with TSS (Figure 20).

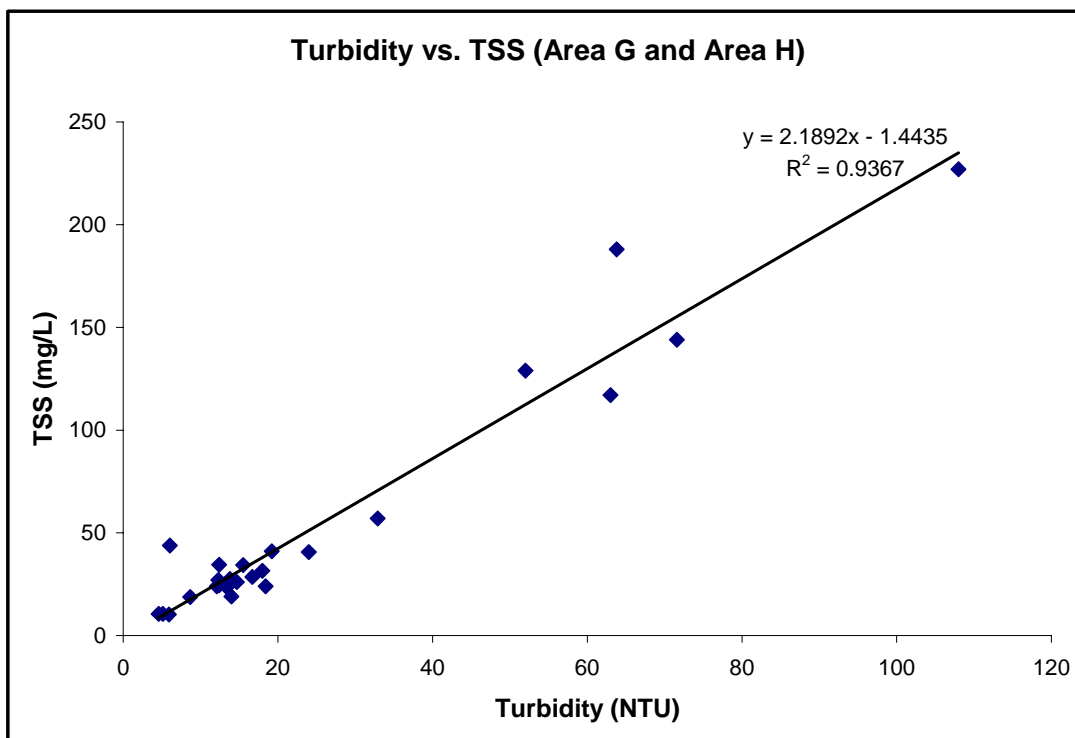


Figure 17. Turbidity vs. TSS Plot (Area G and Area H)

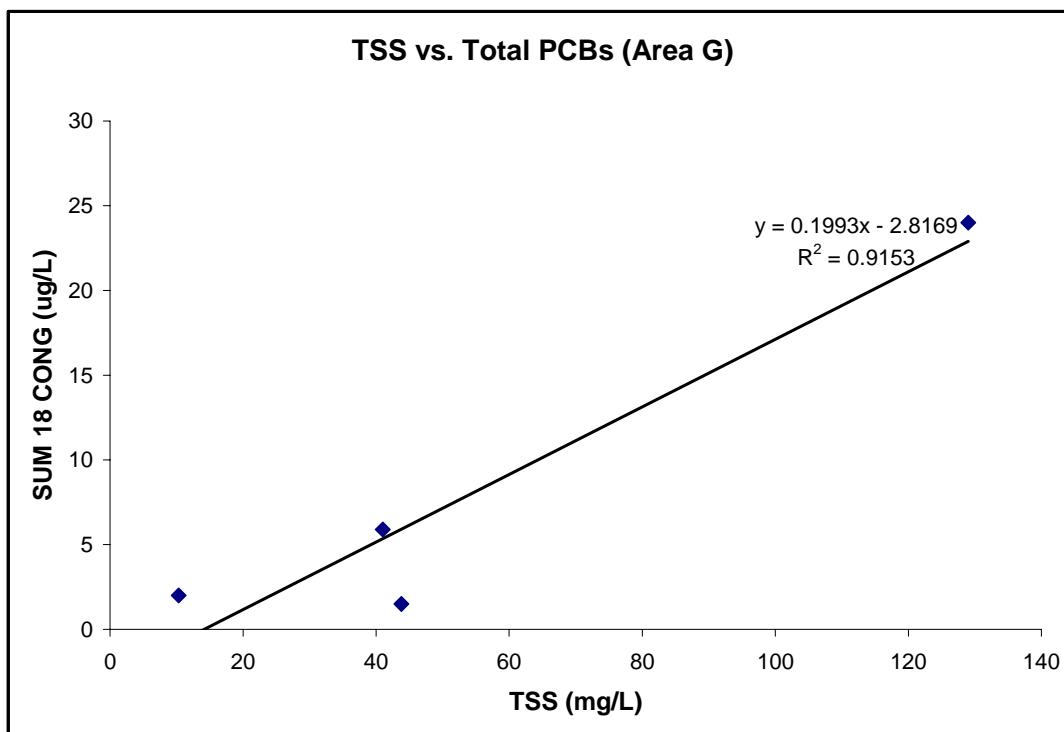


Figure 18. TSS vs. Total PCB Plot (Area G)

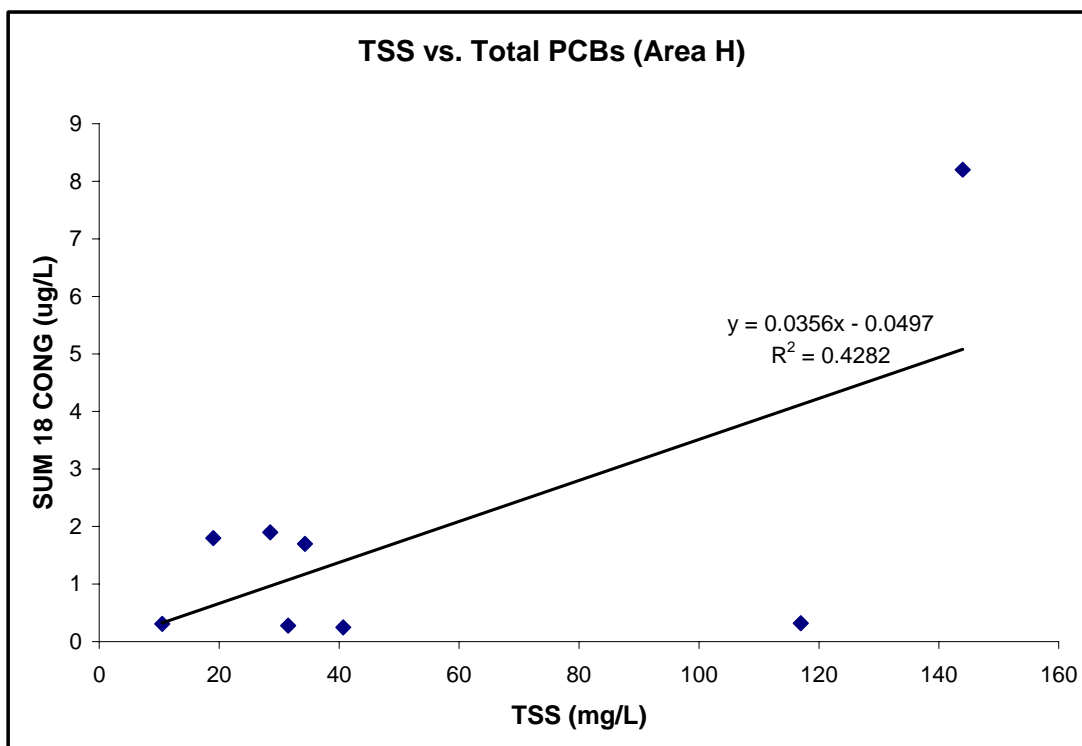


Figure 19. TSS vs. Total PCB Plot (Area H)

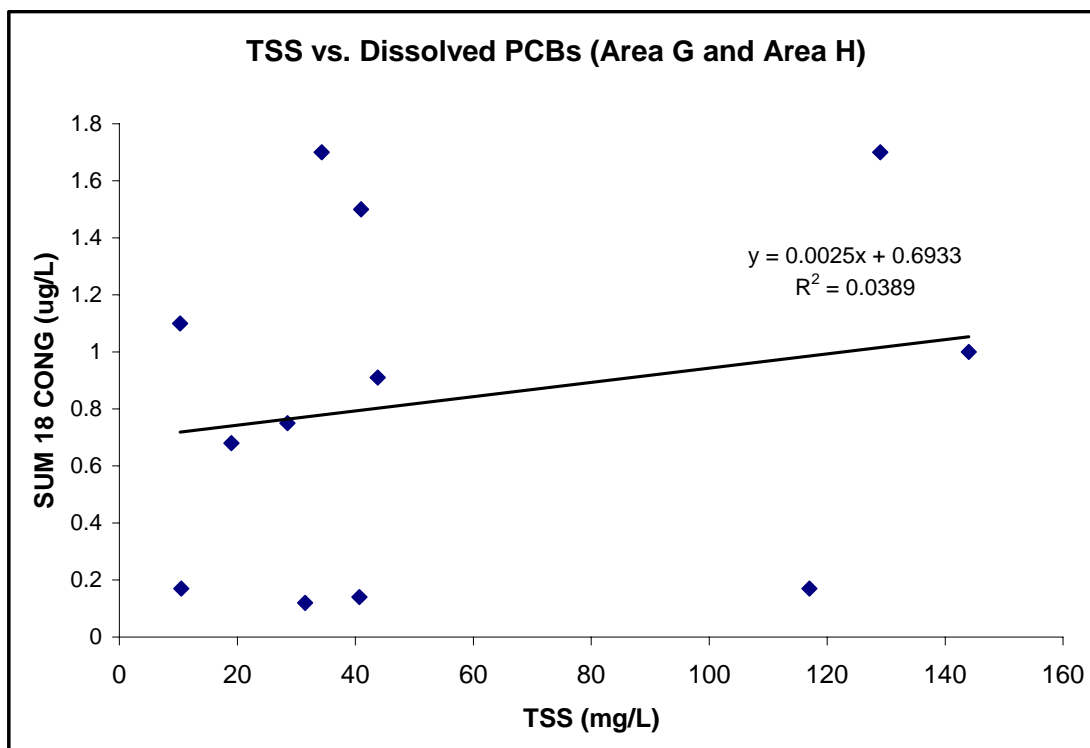


Figure 20. TSS vs. Dissolved PCB Plot (Area G and Area H)



Toxicity testing showed limited significant reduction in endpoints for all species (Table 4). Mean survival in the 48-hr mysid and red alga tests were not significantly different compared to reference (or laboratory control), indicating that there were no measurable acute impacts from exposure of the test species, *A. bahia* and *C. parvula*, to surface water collected at Areas H and G during dredging activities. In contrast, sublethal effects were observed for the 60-minute fertilization and 7-day survival, growth and reproduction tests. For example, *A. punctulata* fertilization was significantly lower than reference for the two surface water samples with the highest concentrations of dissolved PCBs (Table 4), albeit the magnitude of the reductions was small. *Americamysis bahia* mean survival and mean growth and *C. parvula* mean reproduction were significantly lower than reference (and control) for the surface water sample collected at Area G on September 11, 2007. Notably, this sample had the highest turbidity, TSS, and PCB (total and dissolved) concentrations measured during the monitoring season (at dredge Area G). Moreover, several hundred dead fish were observed south of Area G on this date. *Champia parvula* exposed to surface water collected 50-ft down-current of dredging activities at Area H on October 3, 2007 had the lowest cystocarp production. While there does appear to be measurable water column impacts, they appear to be limited to samples containing elevated turbidity, TSS and PCBs, and to areas well within the acceptable project boundaries.

As noted previously, *in situ* turbidity measurements indicated that these turbidity plumes, representing high suspended solids loads and elevated total PCB concentrations, were isolated to the area immediately adjacent to dredging and debris removal and were also relatively short lived. Total PCB concentrations remained relatively low at the dredge boundary and beyond. Dissolved PCBs, which are thought to be the fraction that causes direct toxicity to marine organisms and may be subjected to long range transport, remained low even in the samples with the highest TSS and total PCB concentrations. Overall, no exceedances of the turbidity criterion of 50 NTU above background were observed outside of the 300 ft boundary. While measurable water column impacts were observed based on toxicity testing, these were isolated to samples collected well within the project boundaries. Data collected confirmed that the 50 NTU criterion continues to be ecologically protective, while still allowing remediation efforts to progress.



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6.0 REFERENCES

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- Battelle, 2006b. *Water Quality Monitoring Field Sampling Plan New Bedford Harbor Superfund Site, New Bedford, Massachusetts*. Prepared under Contract DACW33-03-D-0004 Task Order No 0022 for the U.S. Army Corps of Engineers New England District, Concord, MA.
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- Battelle. *Standard Operating Procedures for Identification and Quantification of Polychlorinated Biphenyls (By Congener and Aroclor) and Chlorinated Pesticides by Gas Chromatography/Electron Capture Detection*. SOP 5-128-09 (EPA 8081A, 8082).
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Appendix A

Water Quality Monitoring Field Logs and Tide Data

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Date: 8/6/07

Weather: S wind, sunny w/ building clouds.

Tides:

Low @ 6:40 7:38
High @ 1:48 2:51pm
Low @ 8:53pm

Monitoring Period:

From: 0950 To: 13:15

Tidal Stage: HWS Ebb LWS Flood

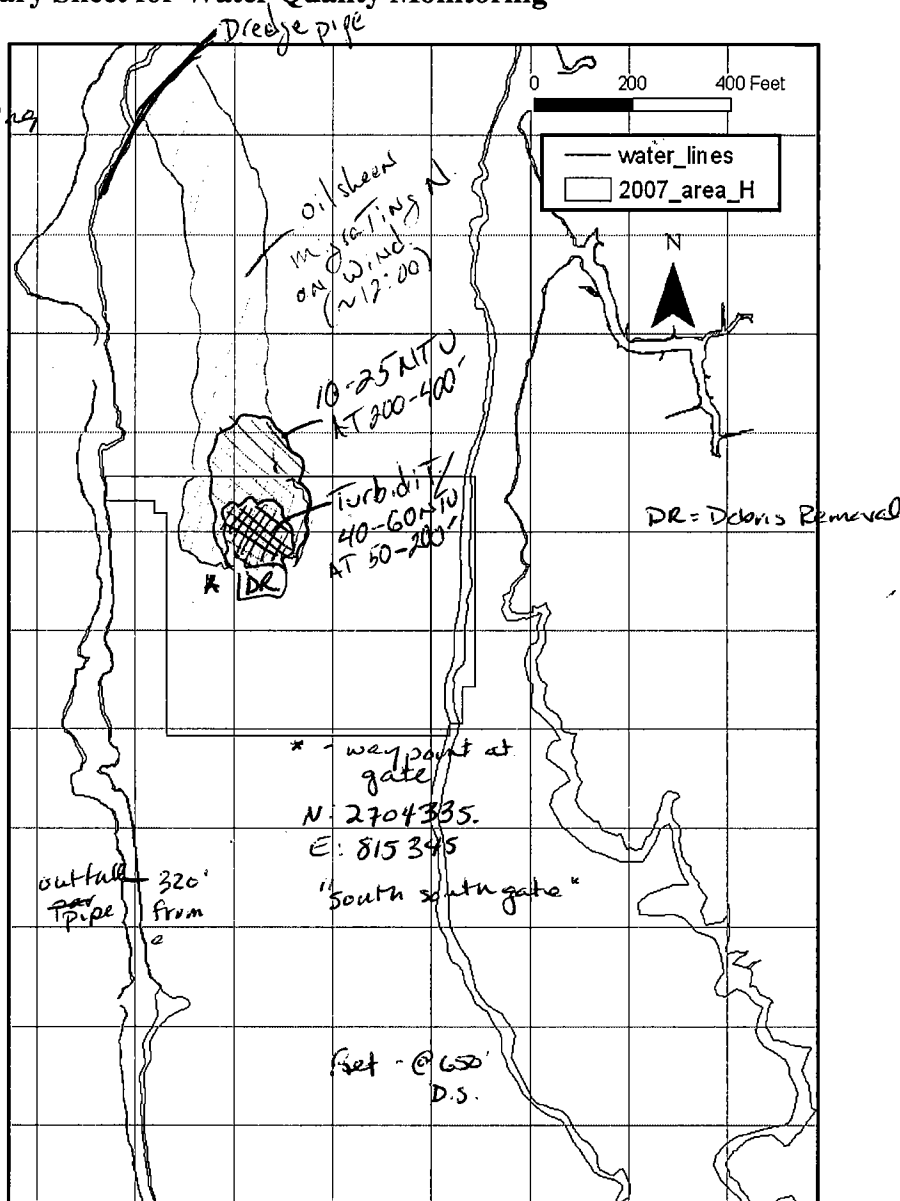
Dredging Activity:

Debris removal

pipe line testing

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Ref.	4.5	2.4



Oil sheen/ Debris:

Sheen moving up to 1,000' N of debris removal

Fish Passage: bait fish active throughout area w/ Gulls and Terns feeding.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
Total PCB (1L) _____ Dissolved PCB (2x1L) _____
Toxicity (21L) _____ Metals (500ml) _____

Notes:

No active dredging - Testing lines. Debris removal in Area-H only active.
Turbidity elevated in close proximity to DR, but < 20 greater than 200'

Sampling Crew: T. Himmer, M. Walsh, A. Manfield

Chief Scientist Signature: *[Signature]*



Date	8/6/07
Page	1 of 1

[illegible]

YSI Calibration Form
Daily 2007 WQ Monitoring for New Bedford Harbor – G606422

Instrument Model # 6920

S/N# N4

Date: <u>8/6/07</u>		Initials: <u>TMH</u>	
DO membrane changed? Y <input checked="" type="radio"/> N	Turbidity Wiper Changed? Y <input checked="" type="radio"/> N		
Battery Voltage: <u>—</u>	Turbidity wiper parks 180° from optics? <input checked="" type="radio"/> Y N		
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>0.8</u>	<u>1.0</u>	Cell constant (4.55 – 5.45)
Depth (ft)	<u>0.3</u>	<u>0.0</u>	Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>-5.2</u>	<u>0.0</u>	Turbidity Offset:
Turbidity (NTU) 123	<u>127.0</u>	<u>123.0</u>	
D.O. (% Sat)	<u>—</u>	<u>101.6</u> TH <u>123</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>4.09</u>	<u>4.01</u>	
pH 7	<u>6.89</u>	<u>7.01</u>	
Comments:			

Date: <u>8/7/07</u>		Initials: <u>MJ</u>	
DO membrane changed? Y <input checked="" type="radio"/> N	Turbidity Wiper Changed? Y <input checked="" type="radio"/> N		
Battery Voltage: <u>4.1</u>	Turbidity wiper parks 180° from optics? <input checked="" type="radio"/> Y N		
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>1000</u>	<u>1000</u>	Cell constant (4.55 – 5.45)
Depth (ft)	<u>-0.059</u>	<u>-0.000</u>	Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>1.0</u>	<u>0.0</u>	Turbidity Offset:
Turbidity (NTU) 123	<u>123.1</u>	<u>123.0</u>	
D.O. (% Sat)	<u>100.2</u>	<u>100.2</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>4.20</u>	<u>4.00</u>	
pH 7	<u>6.73</u>	<u>7.00</u>	
Comments:			

Date: 8/7/07

Weather: overcast / Humid

Tides:

High @ 3:18 pm 3-4
Low @ 8:44 am
High @ 3:55 pm

Monitoring Period:

From: 0930 To: 1230

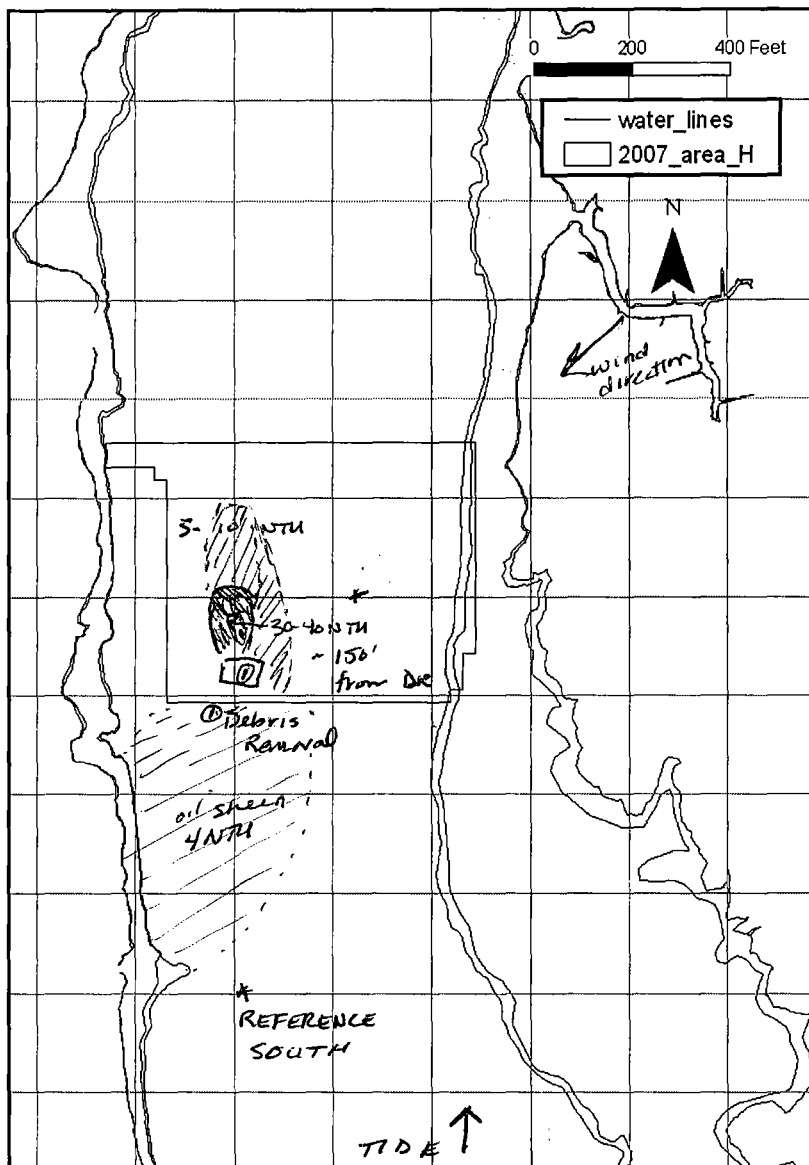
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Debris Removal Area H
Pipeline Testing

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
* REF. SOUTH	2-4	0.5 - 2.0'
150' down up current of debris removal	30-40	~1.5'
400' down up current	5-10	~1.5'



Oil sheen/ Debris:

Heavy sheen noted mid to late morning SW of debris removal outside oil booms.

Fish Passage: Bait fish activity noted within + outside dredge area

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) NO SAMPLES Turbidity (500ml) NO SAMPLES
Total PCB (1L) NO SAMPLES Dissolved PCB (2x1L) NO SAMPLES
Toxicity (21L) NO SAMPLES Metals (500ml) NO SAMPLES

Notes: ① Slight oil sheen outside boom in morning; observed 2-3 gag Herring near Southern oil boom - crippled.

② Oil sheen increased into later morning (shown in sketch) - turbidity remained low.

③ Lots of bait fish activity within and outside dredge area H

Sampling Crew: M. M. S. T. Thomas

Chief Scientist Signature: [Signature]

Water Quality Monitoring

In situ Data Field Form

Dredging Location	AREA H
Dredging Description	Debris Removal Area H
Survey Vessel	Gale Force
Chief Scientist	T. Himmey
Sampling Technician	M. Walsh
Vessel Captain	M. Walsh / T. Himmey
Other Personnel	
Weather conditions	overcast

Date	5/7/07
Page	1 of 1

Tide information		
High	3:18	3.4'
Low	8:44	0.4'
High	3:55	4.5'
Low	10:25	0.7'

[illegible]

Date: 8/8/07

Weather: stormy early am

Tides: windy, humid

3.4' High 4:23 AM @ 3.4' 4:23 AM
0.4' @ 10:00 AM
4.6' @ 16:57

Monitoring Period:

From: 07:30 To: 11:15

* 12:30 15:15

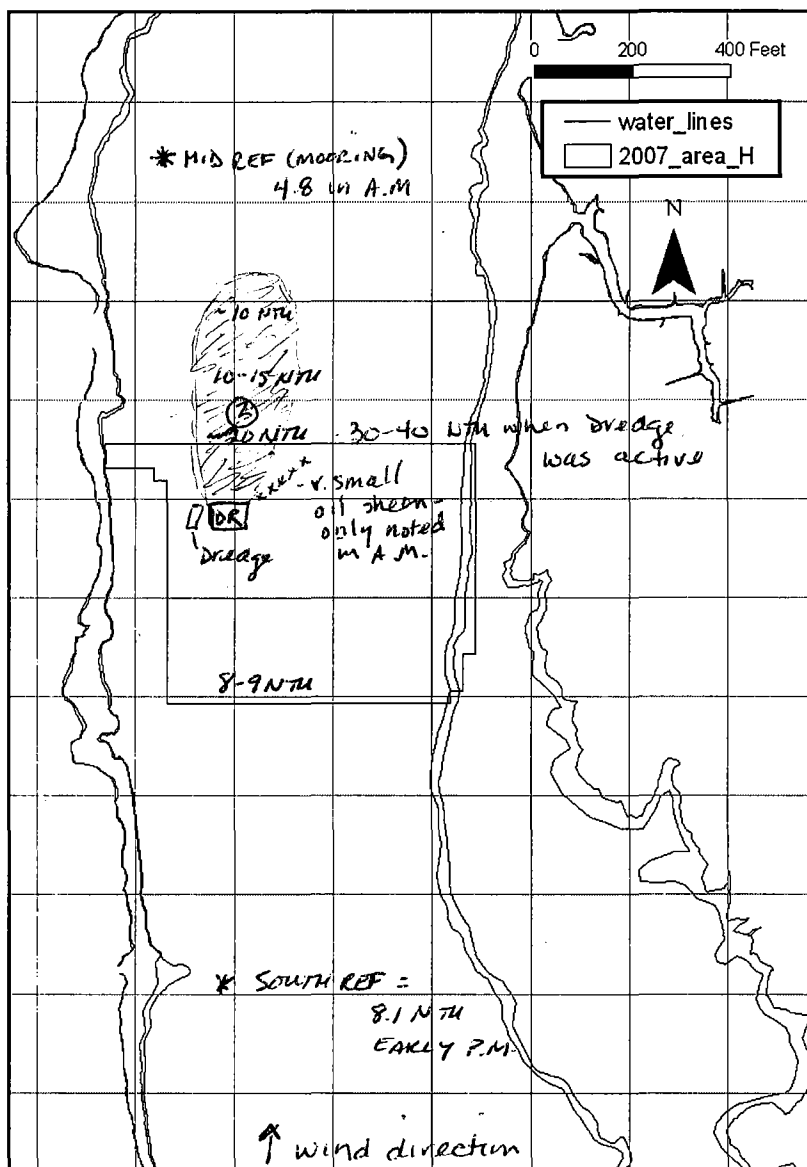
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Debris Removal in Area H;
moved working dredge down
from Area G & moved
broken dredge from Area H
to dock

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
MID REF	4.8	0.8'
N. Dredge Bound.	20.3	0.3'
S. Dredge Bound	8-9	0.3'
① N. Dredge Boundary	30-40 NTU	2.5'



Oil sheen/ Debris:

very small, localized sheen seen in morning morning; contained by
oil booms & dissipated quickly. - See ② below.

Fish Passage: noted a few crippled herring Not area H; numerous birds South
of Area H.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: gusty winds resulted in difficulty maneuvering boat in late
morning.

- ①. Saw readings of 30-40 NTU ~ 100' down current of dredge.
- ②. Small oil sheen noted North of H when actually dredging

Sampling Crew: M. Walsh . JM Himmer

Chief Scientist Signature: [Signature]

Date	8/8/07
Page	1 of 1

Tide information		
High	4:13 am	3.4ft
Low	10:00	.4ft
High	4:57 pm	4.6
Low	11:42 pm	.5

[illegible]

YSI Calibration Form
Daily 2007 WQ Monitoring for New Bedford Harbor – G606422

Instrument Model # 6920

S/N# NA

Date: <u>8/8/2007</u>		Initials: <u>MW</u>	
DO membrane changed? Y <input checked="" type="radio"/> N	Turbidity Wiper Changed? Y <input checked="" type="radio"/> N		
Battery Voltage: <u>NA</u>	Turbidly wiper parks 180° from optics? <input checked="" type="radio"/> Y N		
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>990</u>	<u>1000</u>	Cell constant (4.55 – 5.45)
Depth (ft)	<u>-0.156</u>	<u>-0.001</u>	Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>-0.6</u>	<u>0.0</u>	Turbidity Offset:
Turbidity (NTU) 123	<u>123.0</u>	<u>123.0</u>	
D.O. (% Sat)	<u>99.8</u>	<u>99.8</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>4.06</u>	<u>4.00</u>	
pH 7	<u>6.85</u>	<u>7.00</u>	
Comments:			

Date: <u>8/9/2007</u>		Initials: <u>MW</u>	
DO membrane changed? Y <input checked="" type="radio"/> N	Turbidity Wiper Changed? Y <input checked="" type="radio"/> N		
Battery Voltage: <u>NA</u>	Turbidly wiper parks 180° from optics? <input checked="" type="radio"/> Y N		
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>1017</u>	<u>1000</u>	Cell constant (4.55 – 5.45)
Depth (ft)	<u>0.176</u>	<u>0.000</u>	Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>1.1</u>	<u>0.0</u>	Turbidity Offset:
Turbidity (NTU) 123	<u>122.0</u>	<u>123.0</u>	
D.O. (% Sat)	<u>100.4</u>	<u>100.4</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>4.06</u>	<u>4.00</u>	
pH 7	<u>6.97</u>	<u>7.00</u>	
Comments:			

Date: 8/9/07

Weather: Sunny, NNE Wind @ 5-10 kts

Tides:
3.6' @ 5:25 Am
0.4' @ 11:16 Am
4.7' @ 5:51 7:55 Am

Monitoring Period:

From: 0800 To: 10:30

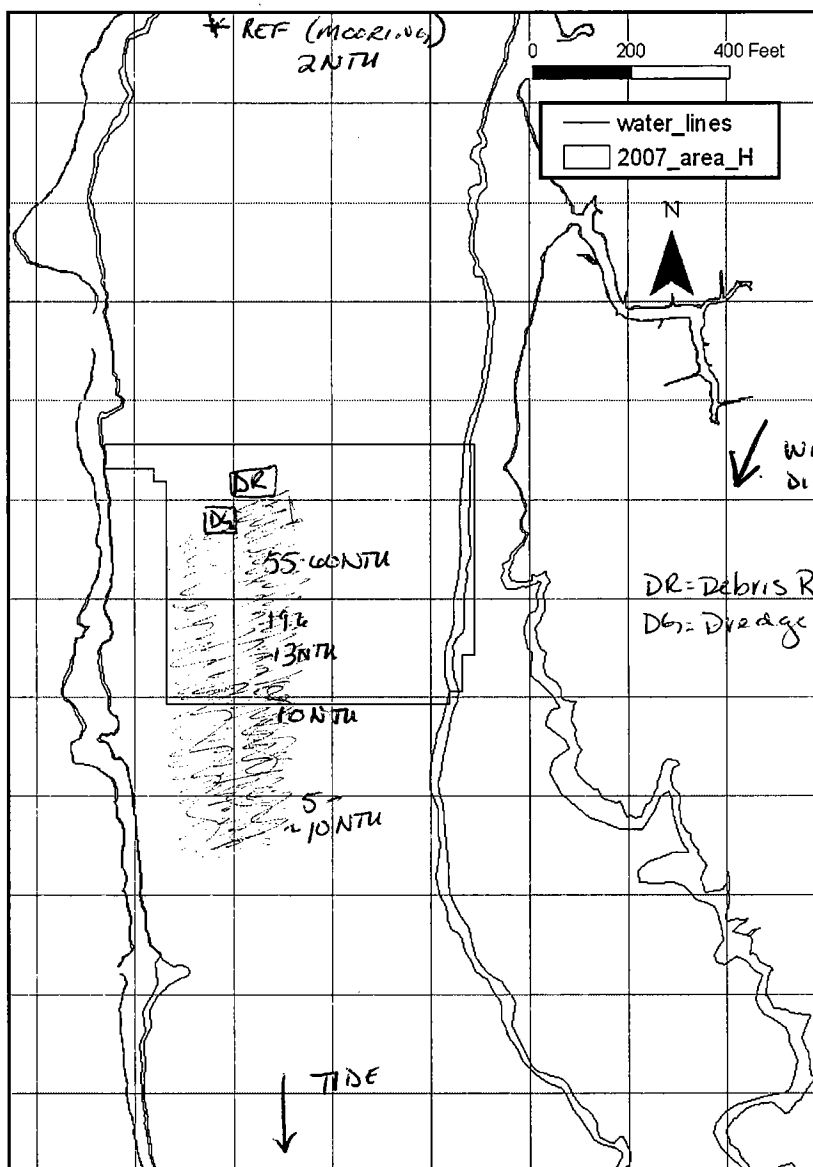
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Debris Removal
Dredge repair + dredging

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	2	1.5'
13NTU	13	1.8
19.6NTU	19.6	2.2
55NTU	55	1.5'
S. Boundary of H	10	1-1.5'



Oil sheen/ Debris:

None noted today

Fish Passage:

Birds working above & below dredge area

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) see attached Turbidity (500ml) see attached
 Total PCB (1L) see attached Dissolved PCB (2x1L) see attached
 Toxicity (21L) see attached Metals (500ml) see attached

Notes: Collected samples for chemistry based on turbidity. Needed to get within ~100-150' of debris removal to get consistent readings near 55NTU. Prop wash in shallow water (from pushing boats) resulted in v. ephemeral spikes of 90-100 NTU - these dissipated very quickly.

Sampling Crew: H. Walsh, T. Himmer

Chief Scientist Signature: [Signature]

Water Quality Monitoring

In situ Data Field Form

Dredging Location	Dredging & Debris Removal - Area H
Dredging Description	↓ TH
Survey Vessel	Gale Force
Chief Scientist	T. Hummer
Sampling Technician	H. Walsh
Vessel Captain	M. Walsh
Other Personnel	N/A
Weather conditions	Sunny - NE wind @ 5-10 kts.

Date	8/9/07
Page	1 of 1

Tide information		
High	5:25 am	3.6'
Low	11:16 am	0.4'
High	17:55 pm	4.7'
Low		

[illegible]

Date: 8/13/07
 Weather: overcast; rain
 Tides:
4.4' @ 8:45
0.0' @ 2:14:47
4.7' @ 21:06

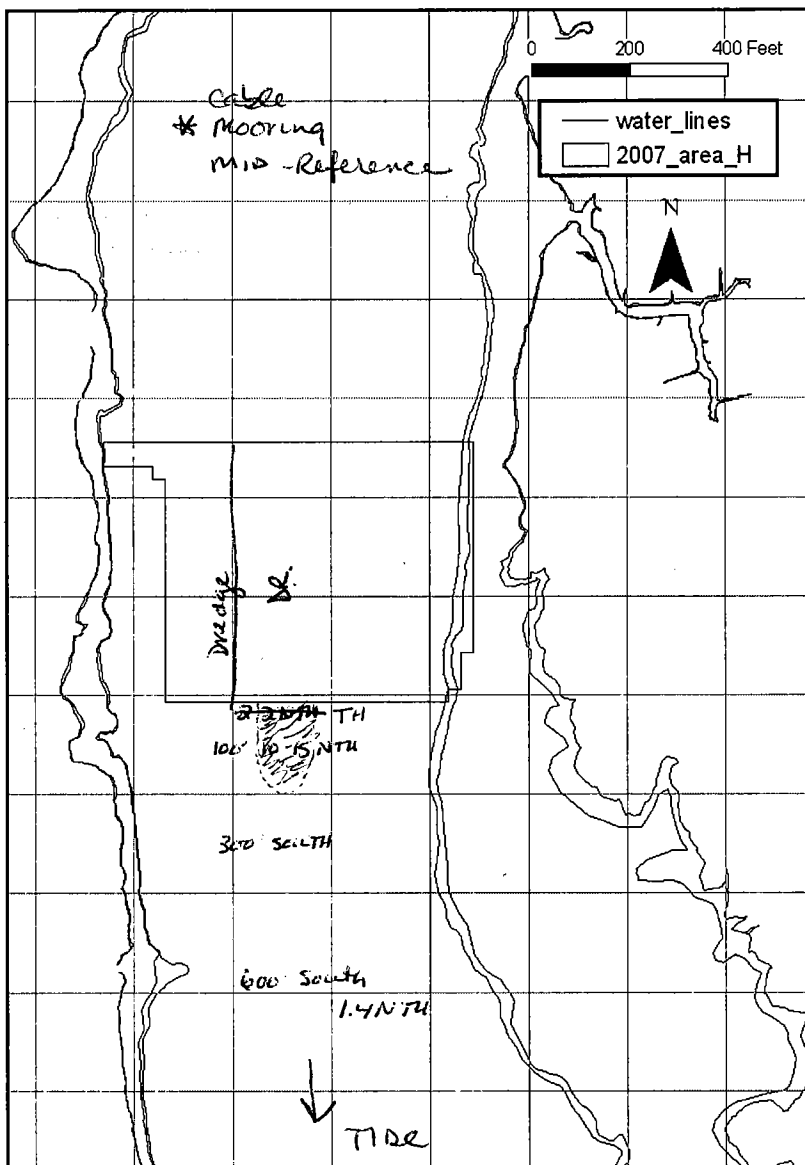
Monitoring Period:
 From: 0930 To: 14:15

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging - Area H
Debris Removal Area H

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Mid-Reference	2.1	1.3'
100' South	1.4	0.7'
100' South	14.3	0.9'
S. Dredge	5.1	0.9'
Boundary in P.M.		



Oil sheen/ Debris:

✓ minor sheen noted next to debris removal - contained by oil boom

Fish Passage: No negative impacts to fish passage observed; fish noted when land outside dredge area moving freely.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) N/A
 Toxicity (21L) N/A Metals (500ml) _____

Notes: any turbidity detected mainly associated w/ debris removed.
Level III ment.

Sampling Crew: J. Hammer, M. Walsh

Chief Scientist Signature: [Signature]

Dredging Location	Area H
Dredging Description	Dredging
Survey Vessel	Gair Force
Chief Scientist	T. Himmer
Sampling Technician	M. Walsh
Vessel Captain	M. Walsh
Other Personnel	N/A
Weather conditions	Rainy, overcast

Date	8/13/07
Page	1 of 1

Tide information		
High	8:45	4.4'
Low	14:47	0.0'
High	21:06	4.7
Low		

[illegible]

Date: 8/14/07
 Weather: sunny, light breeze
 Tides:
0.0 @ 0313
4.4 @ 0928
0.1 @ 1524

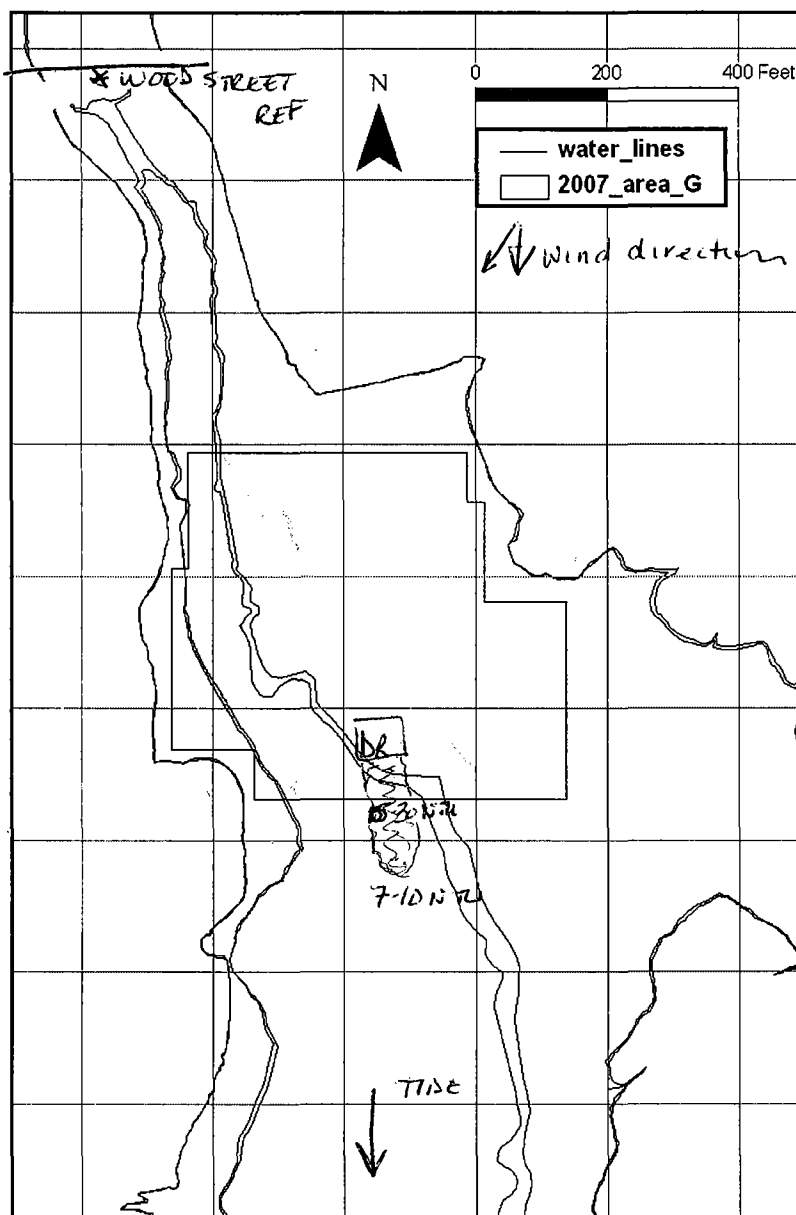
Monitoring Period:
 From: 0945 To: 1130

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal during
high tide; the barge
MOVED BACK TO HQ @ 11:30

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
WOOD ST. REF	8.2	1.0'
DREDGE BOUNDARY	15-30	0.8
200' FROM	7-10	0.8'
DREDGE		
BOUNDARY		



Oil sheen/ Debris:

Sheen; small debris seen during debris removal - all contained by oil boom

Fish Passage: NO fish swimming or fish kills observed; birds working above + below dredge area

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Team looked along pipeline for evidence of obstructed fish passage; no indicators of obstruction observed.
Level III Monitoring

Sampling Crew: T. Hammer ; M. WALSH

Chief Scientist Signature: [Signature]



Water Quality Monitoring

In situ Data Field Form

Date	8/14/07
Page	1 of 1

Tide information		
High	0928	4.4'
Low	15:24	0.0'
High		
Low		

[illegible]

Date: 8/16/07
 Weather: overcast, humid
 Tides:

4.4'	@	10:09
0.3'	@	15:58
4.2'	@	22:26

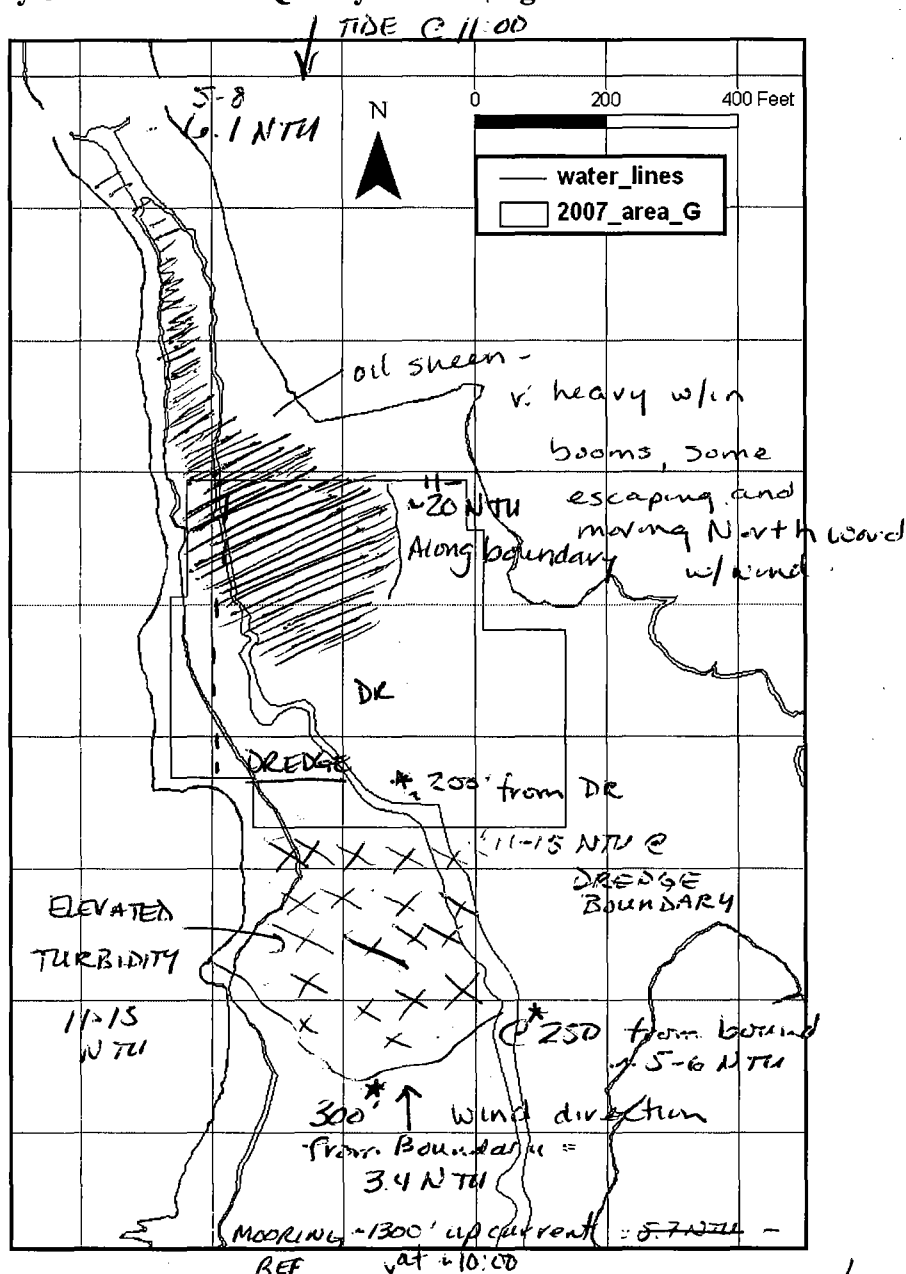
Monitoring Period:
 From: 09:40 To: 12:30

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal - Dredge
Set up

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
WOOD ST BRIDGE	5-8	0.1'
~200' from DR	11.0	0.9'
DREDGE BOUND.	11.1	1.0'
300' from DREDGE BOUNDARY	3.4	10'



Oil sheen/ Debris:

Heavy sheen noted in northern part of area migrating up river w/ wind.

Fish Passage: Birds noted in all areas - SEE NOTE BELOW disseminated slightly by 11:40

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) See attached Turbidity (500ml) see attached
 Total PCB (1L) See attached Dissolved PCB (2x1L) See attached
 Toxicity (21L) See attached Metals (500ml) See attached

Notes: went N. of wood st ~ 800' @ 10:00 am DO @ sampling location = 3.1 @ 1.1' from surface. Noted several dozen dead shad along western shore ofacusnet Liver. Higher DO readings as moved down stream. (6.1 @ WOOD ST. BRIDGE) Also noted some oil sheen along shore line. Steve Fox; Mark Gouveia; PAUL L'HERAUX NOTIFIED

Sampling Crew: Himmer, Walsh, Harvly

Chief Scientist Signature: _____

Dredging Location	AREA 6
Dredging Description	Debris Removal - Dredge Set up
Survey Vessel	GALE FORCE
Chief Scientist	T. HUMMER
Sampling Technician	J. HARDY
Vessel Captain	M. WALSH
Other Personnel	_____
Weather conditions	overcast / humid.

Date	8/16/07
Page	of

Tide information		
High	10:09	4.4'
Low	15:58	0.3'
High	10 22:26	4.2'
Low		

[illegible]

① several dozen snail dead (juvenile along shoreline)

Date: 8/17/07

Weather: Overcast

Tides:

Low tide 0.3 @ 04:37 AM

High tide 4.1 @ 11:32 AM

Low 0.6 @ 05:04 PM

Monitoring Period:

From: 1042 To: 1230

Tidal Stage: (HWS) Ebb LWS Flood

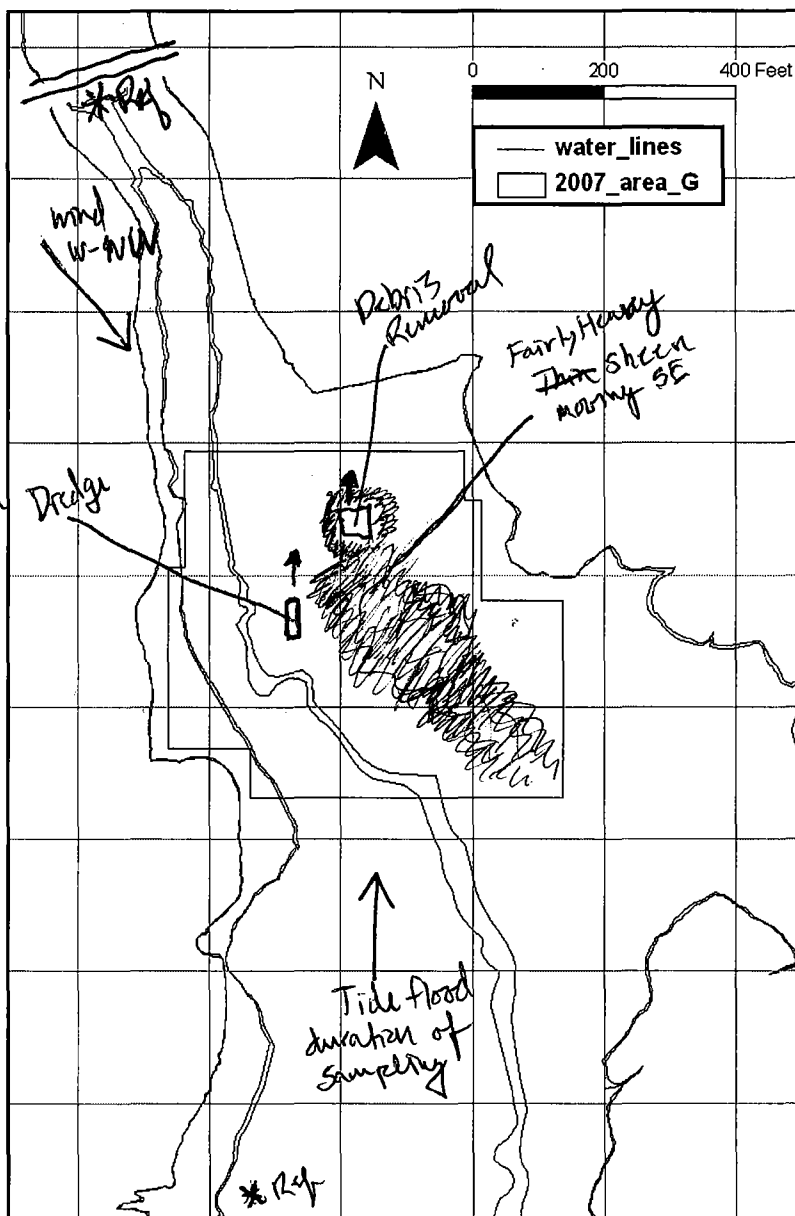
Dredging Activity:

Dredging middle west working to north

Debris Removal North middle working to North

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>WCable Mooring</u>	<u>8.5</u>	<u>6</u>



Oil sheen/ Debris:

Muddy NW to SE from Debris Removal

Fish Passage: Schooling and Feeding Fish at N. St Bridge / Sporadic dead fish noted in dredge area

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____

Total PCB (1L) _____ Dissolved PCB (2x1L) _____

Toxicity (21L) _____ Metals (500ml) _____

Notes:

Light to Heavy sheen moving to south East corner of Dredge Area (Wind W-NW) - Turbidity ranges 20-50 NTU within 100 ft of debris removal 5-10 to low to high teens throughout dredge area.

Dissolved O₂ range 5.5 mg/L to as low as 3.8 mg/L.

Sampling Crew: Mike Walsh + Jessica Faley

Chief Scientist Signature: Mike Walsh

Area G

Debris Removal, dredging

Gale Force

M. Walsh

W. Fehner

M. Walsh

—

Overcast W @ ~5

8-17-07

of

High

~~0437-0.3~~

Low

0437 0.3

High

1132	4.1
------	-----

Low

1704	0.6
------	-----

[illegible]

Date: 8/20/07
 Weather: _____
 Tides: 0.7' @ 0621
3.4 @ 1354
1.2 @ 1910

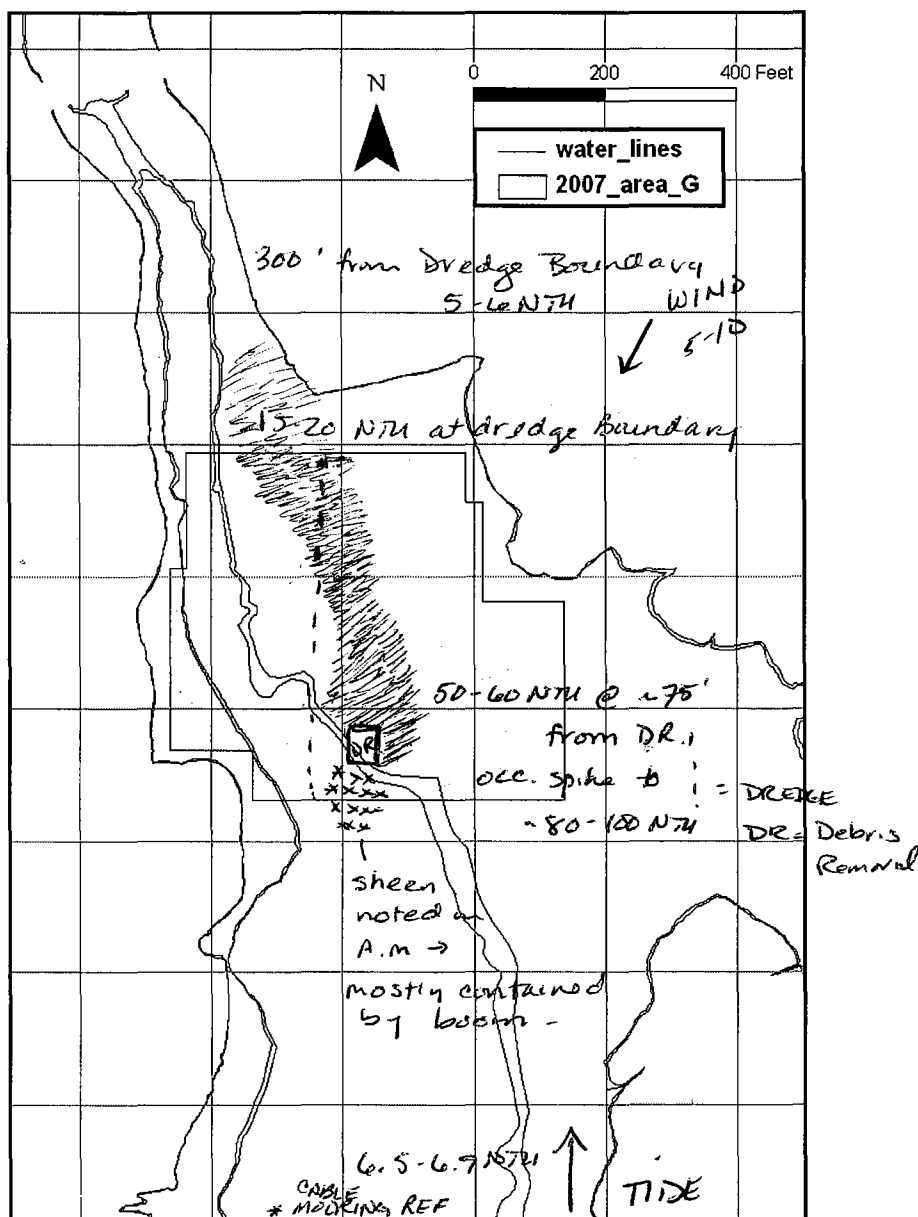
Monitoring Period:
 From: 10:00 To: 13:30

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal
Dredge Placement: Active
Dredging

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
CABLE MOORING	6.5-6.9	D.S. 1/4'
N DREDGE BOUNDARY	15-20 NTU	~1'
300' DOWN CURRENT	5-6	~1'



Oil sheen/ Debris:

LIGHT OIL SHEEN NOTED IN A.M. SOUTH WEST OF D.R. - FAIRLY WELL CONTAINED BY OIL BOOMS.

Fish Passage: BIRDS WORKING NORTH? SOUTH OF DREDGE AREA; NO DEAD FISH NOTED

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Retrieved moorings from N. of dredge area. Saw localized High Turbidity values v. near dredge; debris removal (avg 50-60 NTU w/spikes to 80-100 NTU) v. thin plume traveled ~~upcurrent~~ down current; turbidity dropped to 15-20 by time plume reached dredge boundary.

Sampling Crew: T. Himmer; M. Walsh

Chief Scientist Signature: [Signature]

Water Quality Monitoring

In situ Data Field Form

Dredging Location	AREA H 6
Dredging Description	DREDGING WEST OF GATE; ABOVE DEBRIS REMOVAL TO "6"
Survey Vessel	RV GALE FORCE
Chief Scientist	T. HIMMEL
Sampling Technician	M. WALSH
Vessel Captain	M. WALSH
Other Personnel	N/A.
Weather conditions	SKINNY MILD, LIGHT WIND (5-10 kts) OUT OF NE.

Date	8/20/07
Page	of

Tide information	
High	0.7' 0118
Low	0021 0.7'
High	1354 36'
Low	1910 1.2'

[illegible]

Date: 8/21/07
 Weather: Sunny, BREEZY
 Tides:
 0.9' @ 7:08
 3.6' @ 14:51
 1.3' @ 20:11

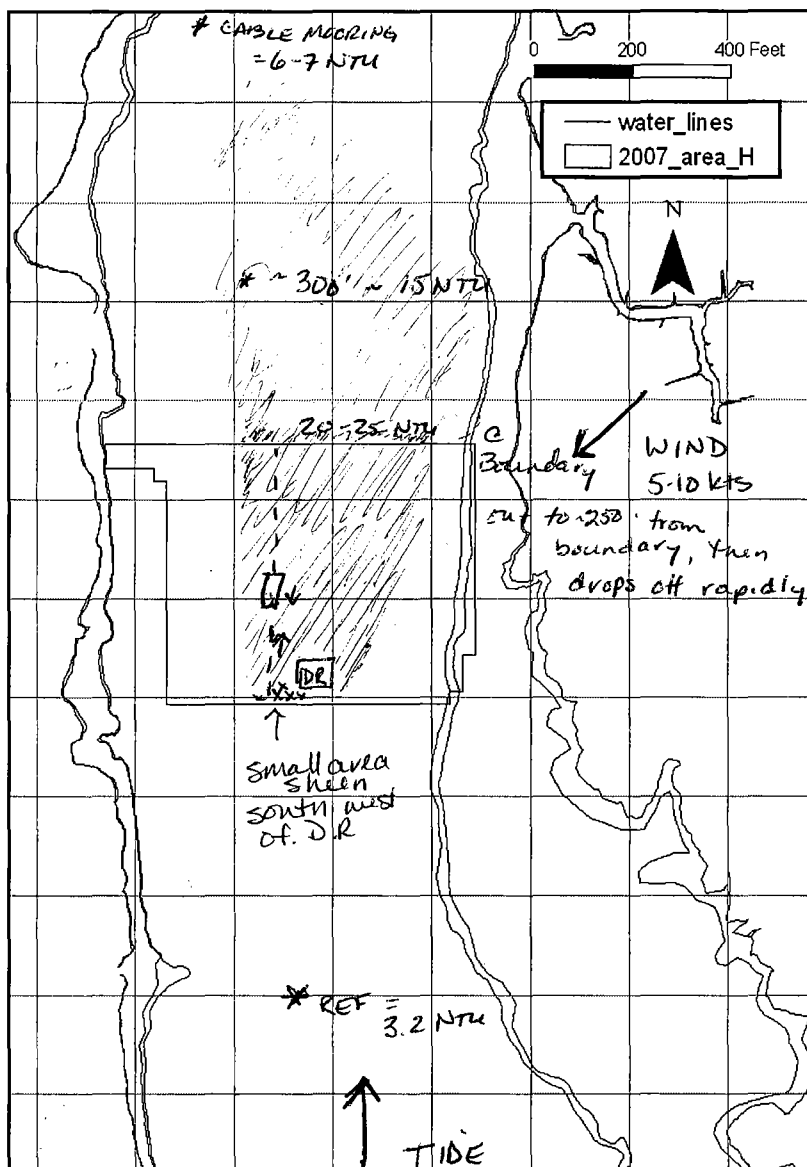
Monitoring Period:
 From: 0930 To: 0120

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal: Dredging
in Area H

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
SOUTH REF	3.2	7' + 1 1/2'
NORTHERN BOUND	20-25 NTU	11/5.3'
300' FROM BOUND	15 NTU	1.1 / 4.0'
CABLE MOORING	6-7 NTU	1.1 / 4.0'



Oil sheen/ Debris:

NONE OBSERVED. NORTH OF DREDGE AREA - SMALL AREA NOTED SOUTH OF DEBRIS REMOVAL - CONTAINED BY OIL BOOMS.

Fish Passage: BIRDS WORKING IN: OUTSIDE DREDGE AREA - SAW BASS OUTSIDE OF DREDGE AREA - BAIT FISH JUMPING WITHIN DREDGE AREA

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) NONE Metals (500ml) NONE

Notes: OBSERVED FAIRLY LARGE, BUT LOW LEVEL TURBIDITY PLUME DURING THE MORNING. VALUES WERE 20-25 NTU AT BOUNDARY; ~15 NTU @ 300' FROM BOUNDARY. PLUME BEGAN TO DISSIPATE AROUND 11:30; READINGS BEGAN TO DROP.

Sampling Crew: HIMMER; WACSH

Chief Scientist Signature: [Signature]

Water Quality Monitoring

In situ Data Field Form

Dredging Location	AREA H
Dredging Description	DEBRIS REMOVAL : DREDGING
Survey Vessel	R.V. GALE FORLE
Chief Scientist	T. HIMMER
Sampling Technician	M. WALSH
Vessel Captain	HIMMER
Other Personnel	N/A
Weather conditions	SUNNY, BREEZY ENE WIND 5-10 kts.

Date	8/21/07
Page	of

Tide information		
High	2:14	2.9'
Low	7:08	0.9'
High	14:51	3.6'
Low	20:11	1.3'

[illegible]

Date: 8/22/07

Weather: _____

Tides: 2.8' @ 3:16
1.0' @ 8:06
3.6' @ 15:50

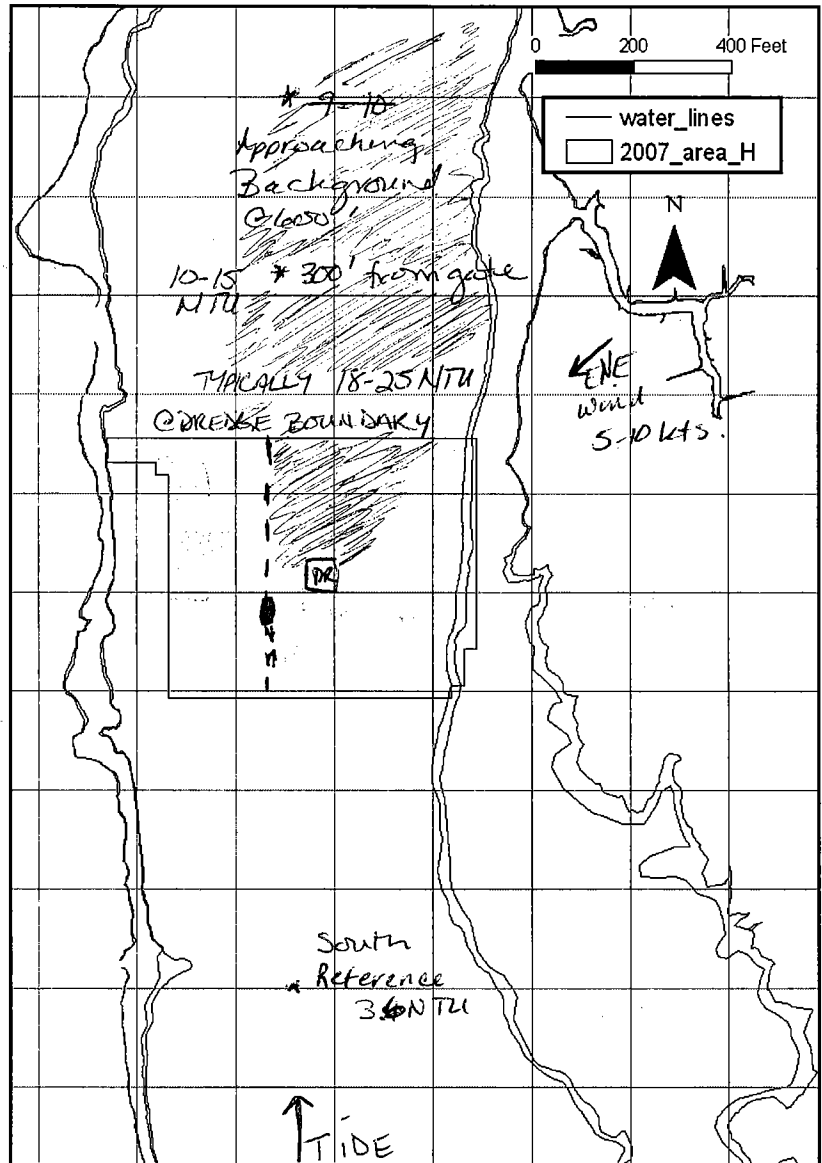
Monitoring Period:
 From: 0930 To: 1200

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
DREDGING & DEBRIS REMOVAL

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Ret - South	3.6	1.1'/4.9
BOUNDARY (NORTH)	21.4	1.5'/4.2'
300' from		
BOUNDARY	13.6	1.1'/3.7'



Oil sheen/ Debris: None Noted

Fish Passage: BIRDS NOTED WORKING ABOVE, BELOW, WITHIN DREDGE AREA

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) None Dissolved PCB (2x1L) None
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Similar to Tuesday 8/21/07; observed widespread but relatively low level plume. Turbidity @ dredge boundary typically averaged 18-25 NTU w/ occasional spikes to 40-60 NTU. at 300' the turbidity had dropped to 10-15 NTU; turbidity values dropped off rapidly between 550-600' from Boundary.

Sampling Crew: M. WALSH ; T. Himmer

Chief Scientist Signature: [Signature]

Date: 8/27/07

Weather: _____

Tides: _____

4.3' @ 7:39
-0.1' @ 1318
4.8' @ 1959

Monitoring Period:

From: 8:45 To: 12:00

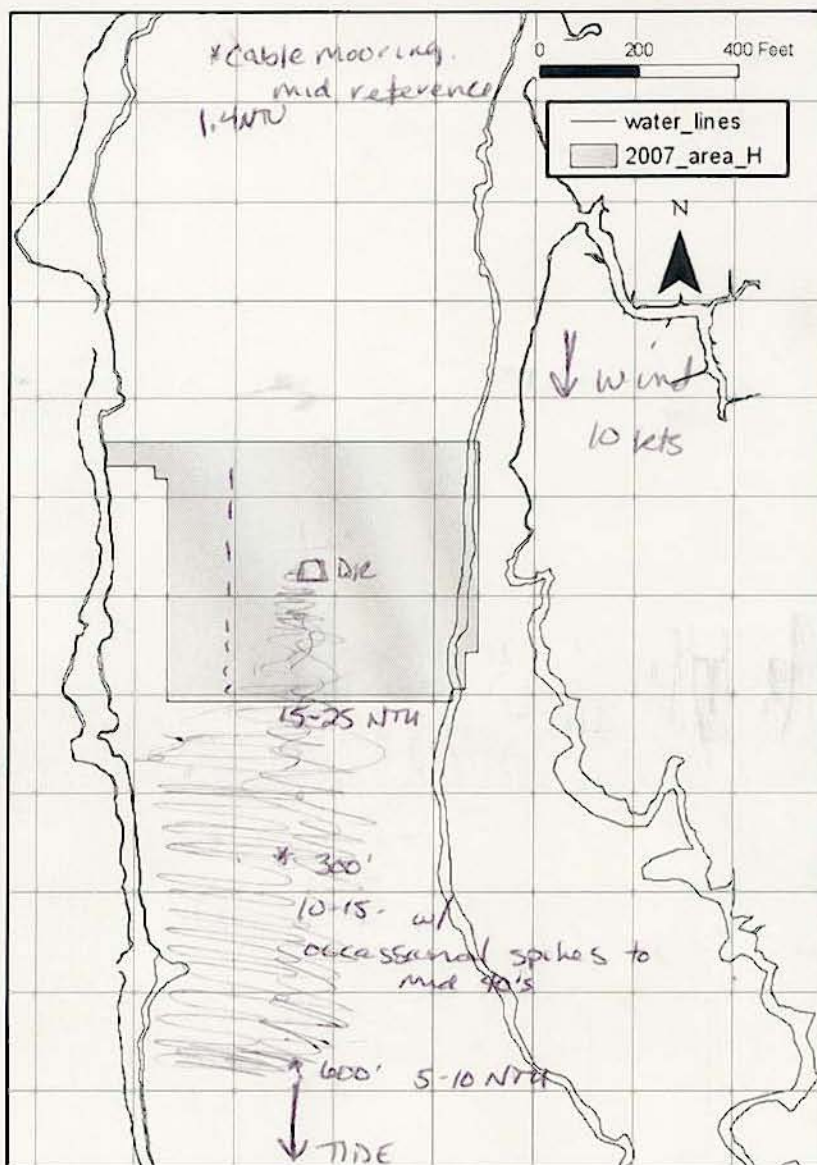
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Debris Removal area H
Dredging in later
morning

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>REF-CABLE</u> <u>MOORING</u>	<u>1.4</u>	<u>1.2</u>
<u>Dredge Bound</u>	<u>21.1</u>	<u>0.66'</u>
<u>300'</u>	<u>10-15 NTU</u>	<u>0.66'</u>



Oil sheen/ Debris:

None observed.

Fish Passage: BIRDS WORKING BETWEEN AREAS 6 & 11

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: widespread but too generally low level plume w/ 15-25 NTU @
dredge boundary; 10-15 NTU @ 300' down current & 5-10 NTU @ 600'.
Between 700-750' from boundary turbidity values returned to reference
levels.

Sampling Crew: T. Himmer, J. Hardy

Chief Scientist Signature: [Signature]

Date: 8/27/07
 Weather: Sunny NW wind.
 Tides:
4.3' @ 7:39
-0.1' @ 1318
4.8' @ 1959

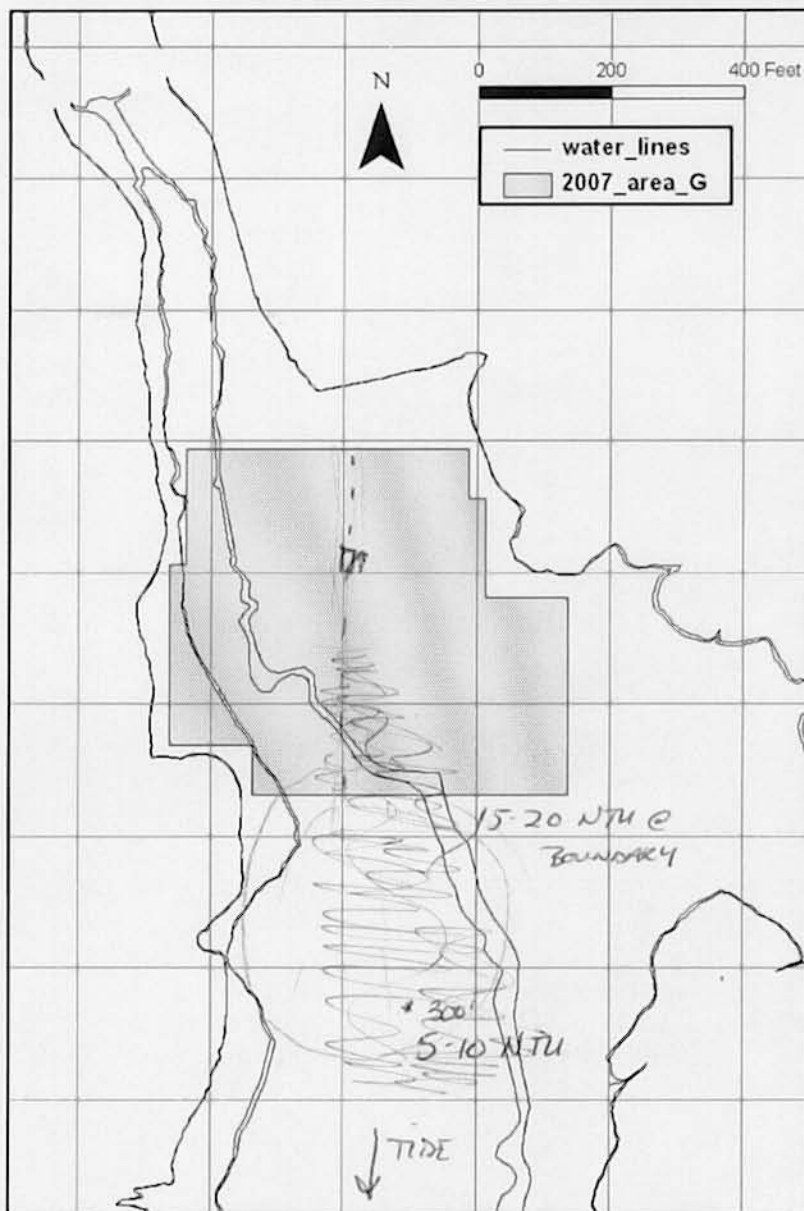
Monitoring Period:
 From: 0845 To: 10:45

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging only, debris
removal in
area H

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
South Boundary	<u>0.7-23.5</u>	<u>0.72</u>
300' from Boundary	<u>5-10</u>	<u>0.72</u>



Oil sheen/ Debris: None observed.

Fish Passage: BIRDS WORKING BETWEEN AREAS G & H

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: 15-20 NTU @ boundary w/ some higher spikes when push boats
being used; @ 300' turbidity down to 5-10 NTU; rapidly
dropped off after 600'

Sampling Crew: T. Himmer J. Hardy

Chief Scientist Signature: [Signature]



Water Quality Monitoring

In situ Data Field Form

Dredging Location	AREA 1 G
Dredging Description	Debris Removal & Dredging
Survey Vessel	GALE FORCE
Chief Scientist	T. Himmer
Sampling Technician	J. HARDY
Vessel Captain	T. Himmer
Other Personnel	N/A
Weather conditions	SUNNY N NE wind @ 10 kts

Date	8/27/07
Page	of

Tide information	
High	4.3' @ 7:39
Low	-0.1' @ 13:18
High	4.8' @ 19:59
Low	

[illegible]

Date: 8-28-07
 Weather: Sunny E/NE 5-10
 Tides:
 high @ 0823
 low @ 1407
 high @ 2044

Monitoring Period:
 From: 0930 To: 1250

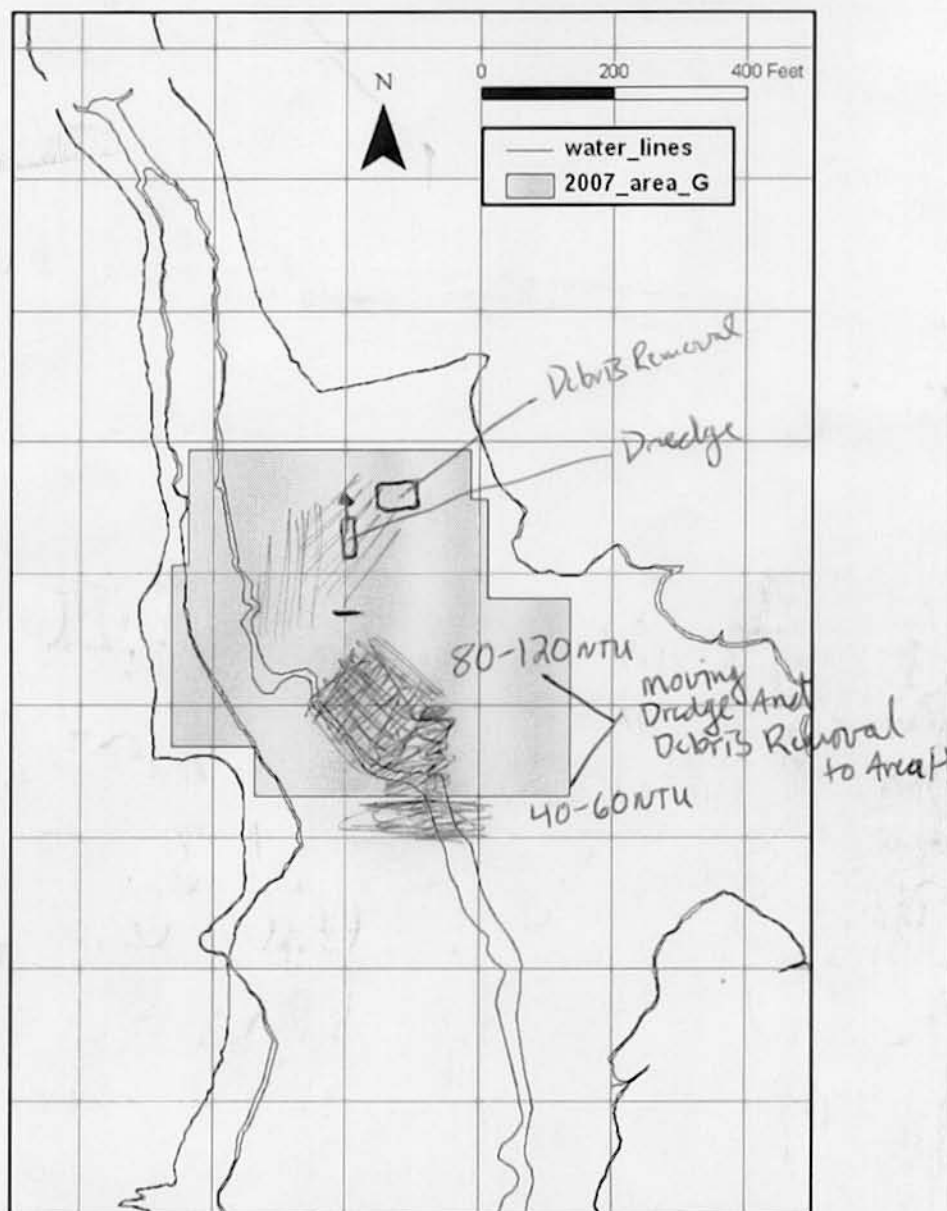
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredge Working middle east to
the North

Debris Removal NE corner

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>Inside Gate South Area G</u>	<u>30.0</u>	<u>.86 / 5.0</u>
<u>1130 Just South of Area G</u>	<u>40-60</u>	<u>.91 / Approx. 4'</u>



Oil sheen/ Debris:

Thin film with spotty blotches concentrated to Dredge + Debris Removal Area. (see below)

Fish Passage: Several small schools and individual fish noted

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

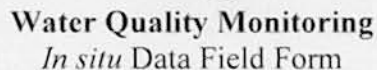
Notes:

Sheen expanded to west as East North East wind developed.

1120 Heavy sheen and Turbidity counts in Dredge Area when moving debris Removal - Counts continued high off Acrova but diminished in deeper water.

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: Michael Walsh



Water Quality Monitoring

In situ Data Field Form

Date	8-28-07
Page	of

Tide information	
High	0823
Low	1407
High	2044
Low	

[illegible]

Date: 8/29/07
 Weather: Sunny, SE wind @ 5 kt
 Tides:
4.9' @ 0908
-0.5' @ 1454
4.8' @ 2129

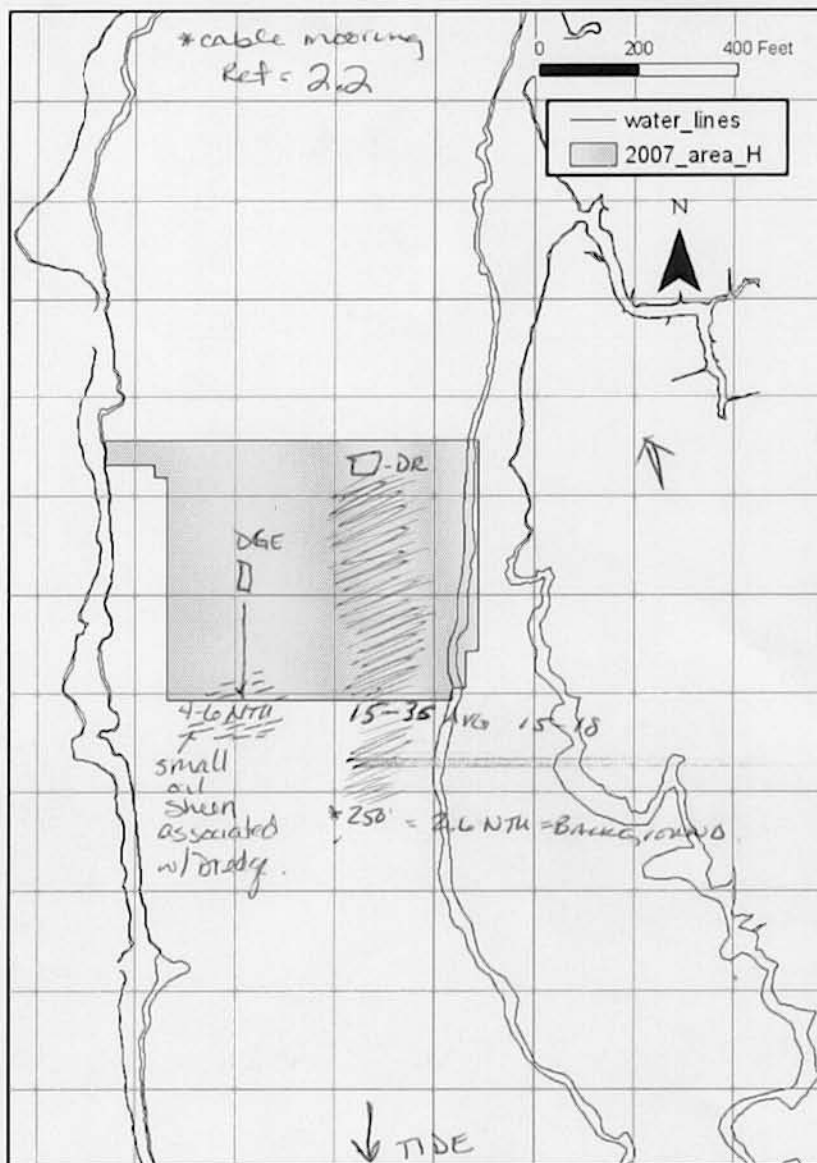
Monitoring Period:
 From: 11:30 To: 12:40

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging + Debris Removal
Debris removal only from
~ 11:45 to 12:30

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF-	2.2	0.7/4.7'
Boundary near Dredge	4-6 NTU	0.7'
Boundary near Debris Removal	15-35 NTU	0.7'



Oil sheen/ Debris:

Small sheen observed south of dredge; did not extend more than ~60' from Dredge Area.

Fish Passage: birds working North; south of dredge area. observed numerous bait fish south of Area H.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: DO Data not collected due to faulty sensor. Highest turbidity readings associated with the debris removal. Dredge only appeared to increase turbidity by 2-4 units.

Sampling Crew: T. Himmer, J. Hardy

Chief Scientist Signature: [Signature]

Date: 8/29/07
 Weather: Sunny, minimal wind
 Tides: out of south
 4.9' @ 0908
 -0.5' @ 1454
 4.8' @ 2129

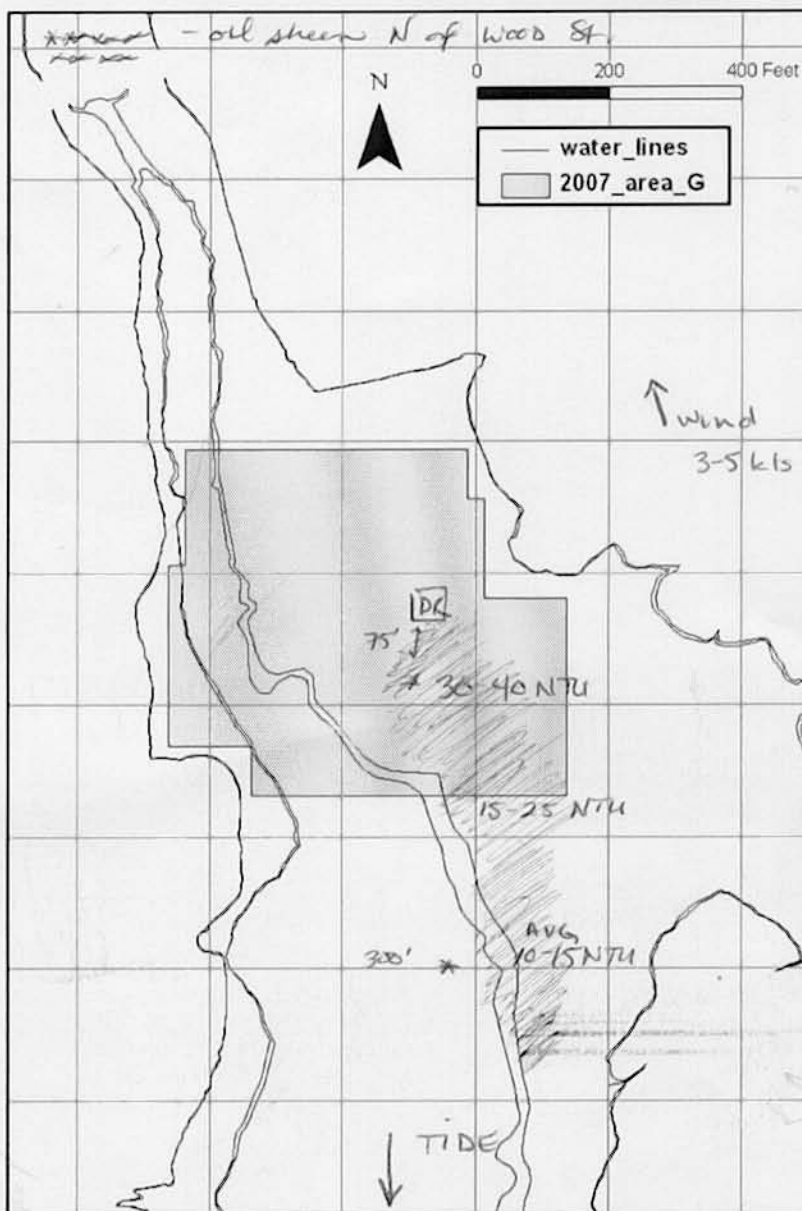
Monitoring Period:
 From: 0920 To: 11:30

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Debris Removal

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF WOOD ST BRIDGE	9.1	0.7/7'
75' from Debris Removal	30.5	0.9/3.0'
Dredge Boundary	17.2	0.7/5.1'
300' from Boundary	10-15 NTU	0.9/5.6'



Oil sheen/ Debris:

oil sheen noted north of Wood St (~350' North of Bridge) due before trial started racing out.

Fish Passage: large numbers of bait fish working immediately south of Wood St or

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) WQ-TSS/TUR-001-004-082907 Turbidity (500ml) - see left.
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: DO data not collected due to bad sensor. Values averaged 15-25 NTU @ Dredge Boundary; decreased with distance down current. No exceedences noted.

Sampling Crew: T. Hemmer J Hardy
 Chief Scientist Signature: [Signature]

Dredging Location AREA H & AREA G
Dredging Description Dredging & Debris Removal - Dredging in Area H
Survey Vessel GALE FORCE Debris Removal in G
Chief Scientist T. Himmer
Sampling Technician J. Hardy
Vessel Captain T. Himmer
Other Personnel N/A
Weather conditions Sunny, wind from SW @ ~5 kts

Date 8/29/07
Page 1 of 1

Tide information
High 4.9' @ 0908
Low -0.5' @ 1454
High 4.8' @ 2129
Low

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
AREA G	ST REF	10:10	2708297	815468	7.0	0.7	9.1	30.19	NA [Ⓢ]	24.7	WG-TSS/TUR-001-082907
	"	10:12	↓	↓	↓	↓	↓	↓	↓	↓	WG-TSS/TUR-001-082907 dup
	AREA G, 75'	10:35	2707403	815930	3.6	0.9	36.5	30.5	NA	25.0	WG-TSS/TUR-002-082907
	From Debris Removal										
	Dredge Bound.	11:00	2707174	816015	5.1	0.7	17.2	30.5	NO	25.2	WG-TSS/TUR-003-082907
AREA G	300' from Dredge Bound	11:21	2706926	816015	5.4	0.9	16.7	30.5	—	25.5	WG-TSS/TUR-004-082907
MID	MOORING REF	11:35	2705626	815279	4.7	0.7	2.2	30.7	—	24.8	NA

Ⓢ Bad DO sensor, ~~average~~ DO data not collected. TH 8/29/07

Date: 9/4/07

Weather: Mostly Sunny Wind NE S

Tides:

0.4	@	0719
4.4	@	1432
0.8	@	2053

Monitoring Period:

From: 0930 To: 1340

Tidal Stage: HWS Ebb LWS Flood

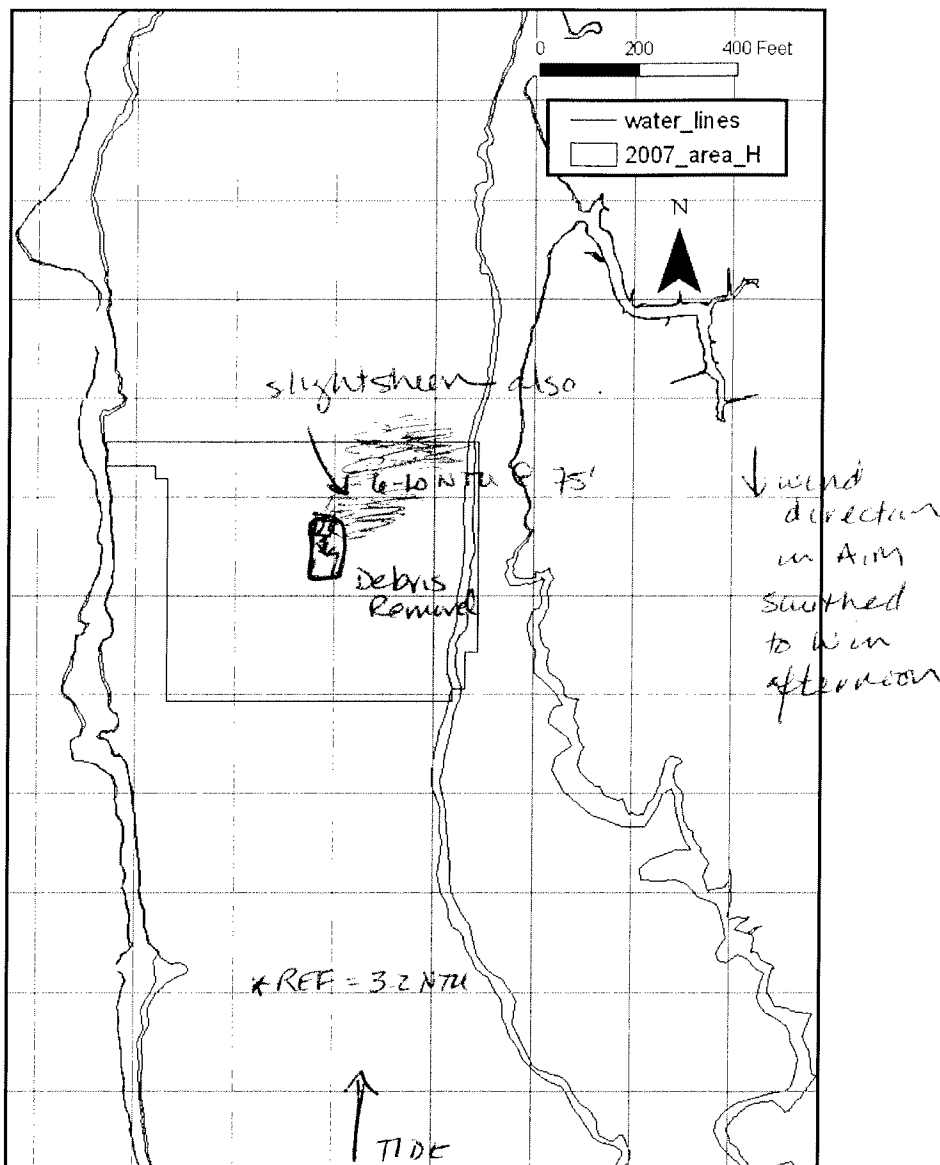
Dredging Activity:

ON Hold until 11/15-11/30

Debris Removal from
11:15 to 13:30

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	32	0.6/5.8
~75' from Debris Removal	6-10	1.0



Oil sheen/ Debris:

light sheen noted Northeast of debris removal

Fish Passage:

Birds noted above and below work area.

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L)	_____	Turbidity (500ml)	_____
Total PCB (1L)	_____	Dissolved PCB (2x1L)	_____
Toxicity (21L)	_____	Metals (500ml)	_____

Notes: Due to holiday dredging started later. Floccings from around area G were retrieved. Slight elevations in turbidity seen associated with debris removal (6-10 NTU @ 75-80' away).

Sampling Crew: T. Hammer, M. Walsh

Chief Scientist Signature: *[Signature]*



Water Quality Monitoring

In situ Data Field Form

Date Page	9/4/07
	of

Tide information

[illegible]

Date: 9/5/07
 Weather: _____
 Tides: 3.3' @ 0304
0.16' @ 0835
4.3' @ 1540

Monitoring Period:
 From: 9:30 To: 12:50

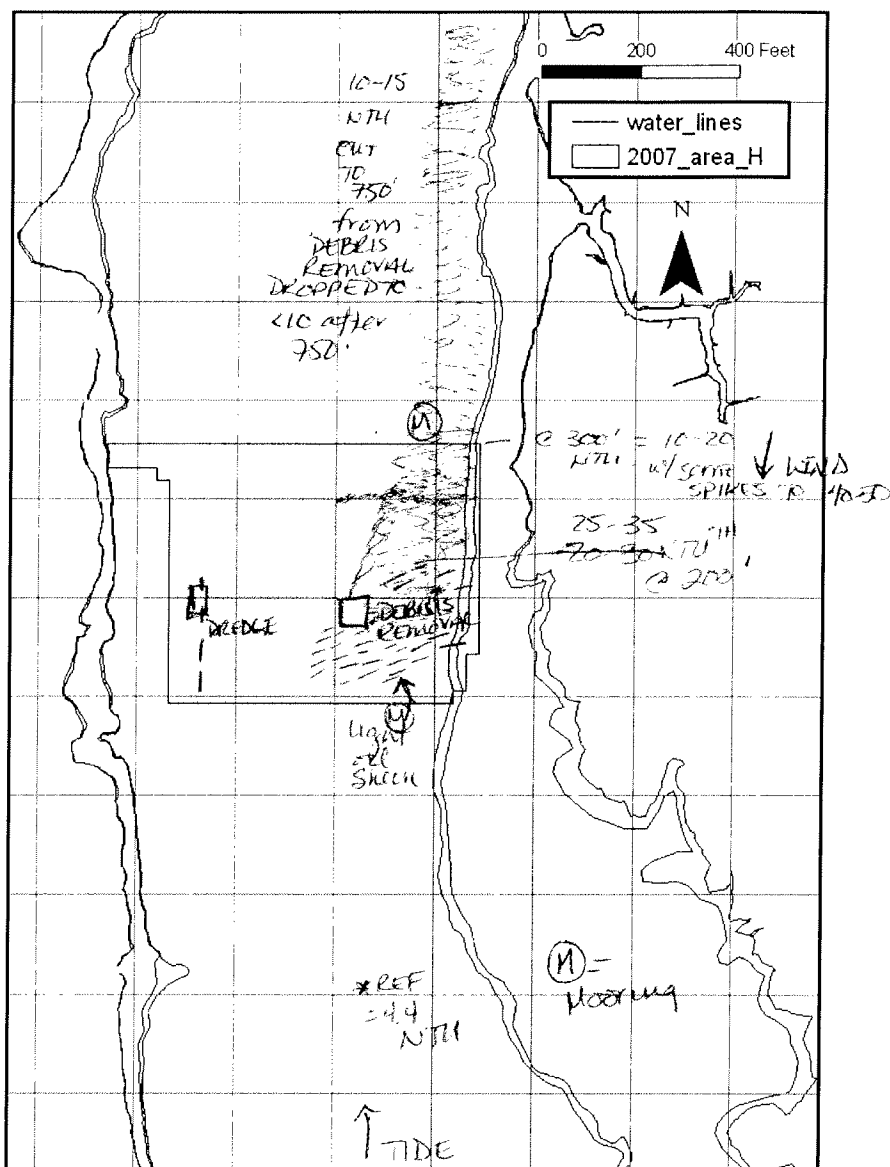
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

HOSTLY DEBRIS REMOVAL,
DREDGE WASN'T ACTIVE
ENTIRE TIME.

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	4.4	0.7 / 4.7'
200' from DEBRIS REMOVAL	30 NTU	0.8
300' from DEBRIS REMOVAL	15 NTU	0.7



Oil sheen/ Debris:

OBSERVED LIGHT OIL SHEEN DURING LATE MORNING TO SOUTH ~~WEST~~ ^{EAST} OF DEBRIS REMOVAL - CONTAINED BY FOMS.

Fish Passage: BIRDS FORAGING ABOVE & BELOW DREDGE UNIT.

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: ~~DE~~ OBSERVED A WIDESPREAD TURBIDITY PLUME TO THE NORTH ~~WEST~~ ^{EAST} OF THE DEBRIS REMOVAL. TURBIDITY VALUES TYPICALLY RANGED FROM 25-35 NTU @ 200' AND 10-20 NTU AT ~300' FROM THE DEBRIS REMOVAL. OCCASIONAL HIGHER SPIKES WERE OBSERVED WHERE VALUES REACHED 40-50 NTU AT 275 TO 300'; THESE SPIKES (cont)

Sampling Crew: Jheresa Himmer, Jessica Hardy

Chief Scientist Signature: [Signature]

(cont) were spatially & temporally short lived and were not sampled because they dissipated quickly.

Water Quality Monitoring

In situ Data Field Form

Dredging Location	Area H
Dredging Description	Mostly debris removal; some dredging
Survey Vessel	RV GALE FORCE
Chief Scientist	T. Himmick
Sampling Technician	Jessica Hardy
Vessel Captain	T. Himmick
Other Personnel	N/A.
Weather conditions	Sunny, 0 wind up to 10 kts.

Date	9/5/07
Page	1 of 1

Tide information		
High	0304	3.3'
Low	0835	0.6'
High	1546	4.3'
Low	2229	0.7'

[illegible]

Date: 9/10/07
 Weather: OVERCAST, RAINY
 Tides:
4.4' @ 7:38
0.1' @ 13:34
4.5' @ 19:59

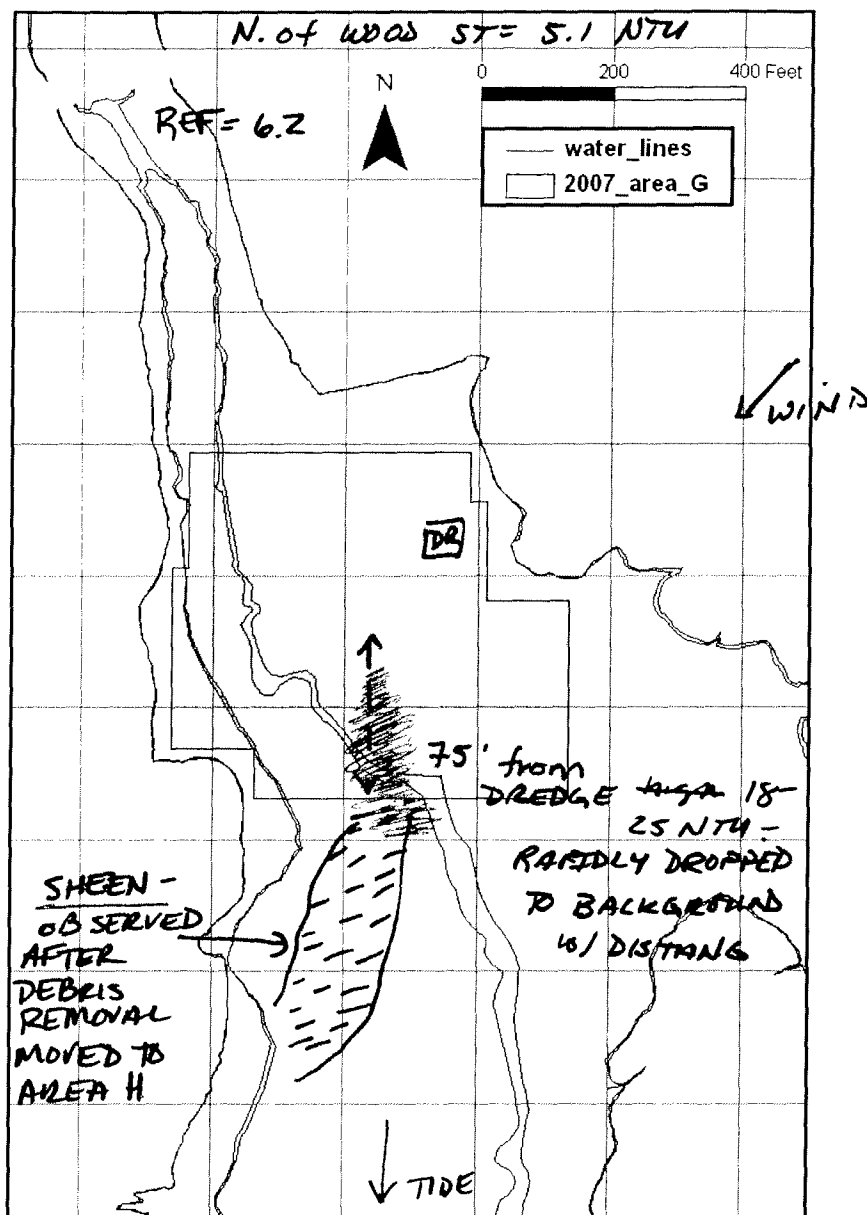
Monitoring Period:
 From: 0900 To: 10:15

Tidal Stage: HW Ebb LWS Flood

Dredging Activity:
DREDGING; SOME DEBRIS
REMOVAL EARLY ON.
DEBRIS REMOVAL BARGE
MOVED TO AREA H @ 9:45

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	6.2	0.7
75' from DREDGE	18-25	0.7'



Oil sheen/ Debris:

HEAVY SHEEN OBSERVED SOUTH OF DREDGE AREA;

Fish Passage: LARGE NUMBER OF GULLS WORKING IN AND AROUND DREDGE UNIT.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Localized Turbidity Plume noted 75-100' from Dredge; beyond 100' birds returned quickly to background.

Sampling Crew: T. HUNTER, J.C. HARDY

Chief Scientist Signature: [Signature]

Date: 9/10/07
 Weather: OVERCAST
 Tides:
4.4' @ 7:38
0.1' @ 13:54
4.5' @ 19:59

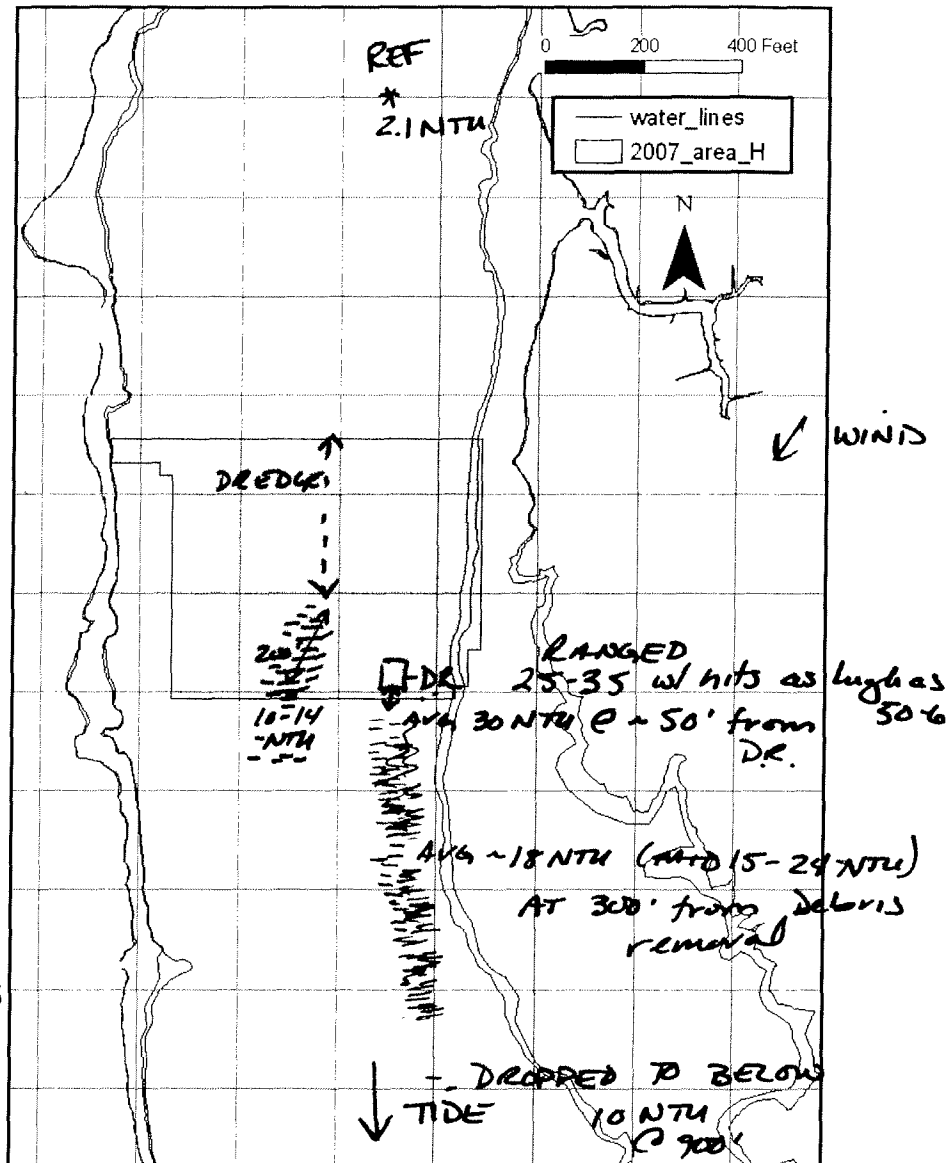
Monitoring Period:
 From: 10:15 To: 1:45

Tidal Stage: HWS (Ebb) LWS Flood

Dredging Activity:
DEBRIS REMOVAL;
MOVE: SET UP DREDGE,
MOVING GATES.

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	2.1	0.76
200' SOUTH OF DREDGE	12	0.8/4.3
50' SOUTH OF DEBRIS REMOVAL	29	0.8/32



Oil sheen/ Debris:

SMALL, BUT HEAVY SHEEN OBSERVED SOUTH OF DEBRIS REMOVAL. EXTRA BOOMS ADDED.

Fish Passage: BIRDS WORKING SOUTH OF DREDGE UNIT; LARGE NUMBERS OF FISH JUMPING IN SOUTHWEST CORNER.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: DO VALUES RANGED FROM 3-4; generally 3.5 to 3.7 mg/L.
NARROW TURBIDITY PLUME FROM DEBRIS REMOVAL DETECTED OUT TO ~700'
TURBIDITY ASSOC'D W/ DREDGE REMAINED IN MID TEENS TO ~200'; DROPPED RAPIDLY.

Sampling Crew: J.C. HARDY; T.M. HIMMER.

Chief Scientist Signature: [Signature]

Dredging Location	DREDGING + DREDGE REMOVAL IN GREAT
Dredging Description	✓
Survey Vessel	GALE FORCE
Chief Scientist	T. HILMER
Sampling Technician	J. C. HARKIN
Vessel Captain	T. HILMER
Other Personnel	N/A
Weather conditions	OVERCAST RAINY

Date	9/10/07
Page	1 of 1

Tide information	
High	4.4' @ 7:38
Low	0.1' @ 13:54
High	4.5' @ 19:59
Low	

[illegible]

Date: 9/11/07

Weather: overcast

Tides:

High 4.5 @ 0819

Low 0.1 @ 1428

High 4.4 @ 2039

Monitoring Period:

From: 0745 To: 11:30

Tidal Stage: HWS Ebb LWS Flood

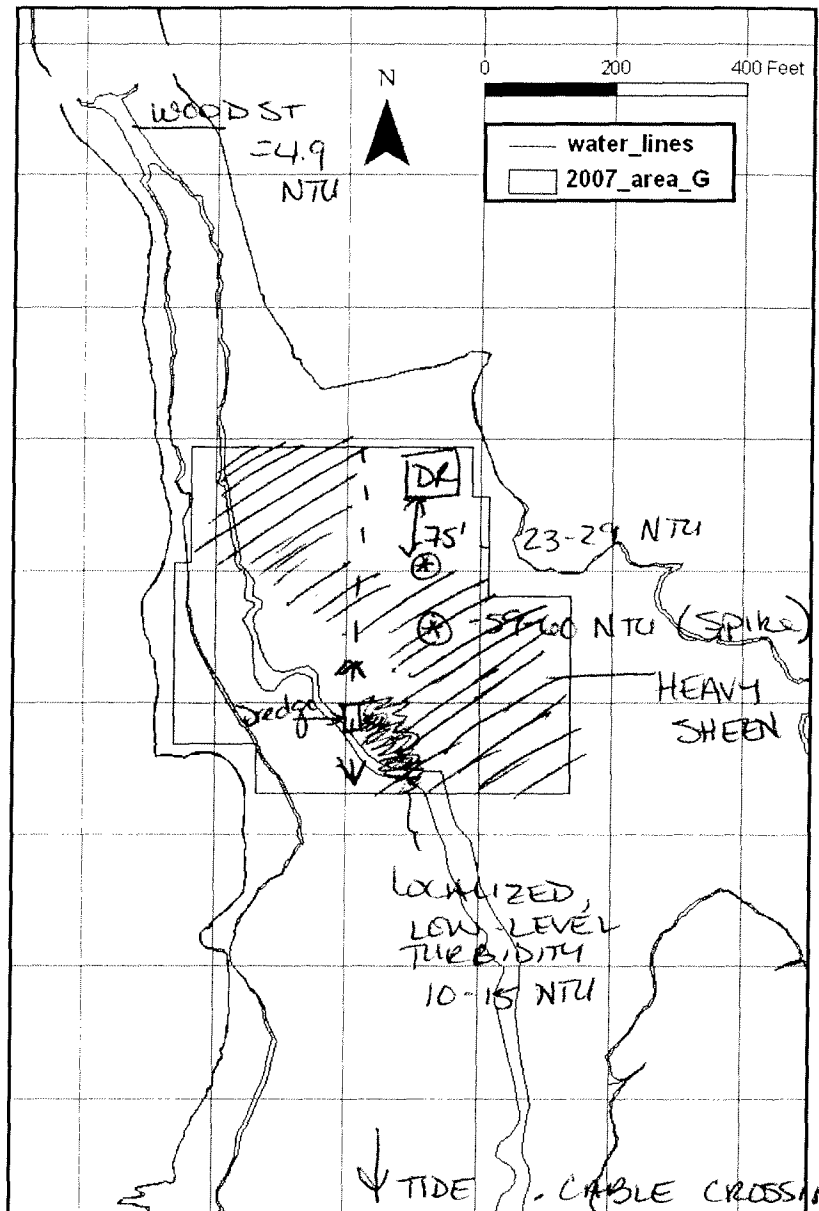
Dredging Activity:

Dredging: Debris

Removal

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
WOOD ST REF	4.9	0.6 / 6.0
CABLE CROSSING (SOUTH)	1.3	0.72 / 6.2



Oil sheen/ Debris:

VERY HEAVY SHEEN NOTED; APPEARED TO BE ASS'D MOSTLY W/ THE 1.3 NTU

Fish Passage:

~~SEVERAL~~ * NUMEROUS DEAD HERRING; POSSIBLE MENHADEN WITHIN SOUTH OF DREDGE AREA. (SEVERAL HUNDRED)

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) WQ-TSS-TUR-001-091107-TU Turbidity (500ml) See Left
 Total PCB (1L) WQ-TPC-001-091107 Dissolved PCB (2x1L) WQ-DPC-001-091107
 Toxicity (21L) WQ-TOX-001-091107 Metals (500ml) WQ-MET-001-091107

Notes: COE WAS NOTIFIED OF FISH KILL; Debris Removal shut down; additional oil booms deployed. Diss. O₂ values ranged from 1.47 to 2.75 mg/L.

Sampling Crew: T. Himmer, M. Walsh

Chief Scientist Signature: Mike

Dredging Location	Area 6
Dredging Description	Dredging + Debris Removal
Survey Vessel	Gale Force
Chief Scientist	T. Himmer
Sampling Technician	M. Walsh
Vessel Captain	M. Walsh
Other Personnel	-
Weather conditions	overcast

Date	9/11/07
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Tide information	
High	4.5 @ 0819
Low	0.1 @ 1428
High	4.4 @ 2039
Low	

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
Ref M.A.		0751	2705780.03	815591.00	6.2	.72	1.3	29.95	2.40	22.15	
Mooring	6 South	0807	2707026.83	816098.40	7.0	.3	1.4	29.67	2.07	22.4	WQ Ref for Mooring 6 South
Mooring	6 North	0836	2707904.12	815673.24	6.0	.6	3.5	29.7	2.75	22.41	WQ Ref for Mooring 6 North
Ref Wood St Bridge		0857	2708263.77	815486.44	7.1	.6	4.9	29.5	2.49	22.28	WQ-XXX-001-091107 - 9-01
15' from DC	115 NTU 80 NTU 23-29 NTU	0945	2707619	815972	4.0'	1.2	23-49 115 23-29 NTU	29.69	1.42	22.37	WQ-XXX-001-091107 - Dup ① WQ-XXX-002 - 9-01
	60 NTU										
	10:15		2707557.43	815953.3	4.0	1.2	59-6	29.80	1.79	22.35	WQ-XXX-003-091107
	EQ B100	10:50									WQ-PCB-004-091107-EB -MET

Dups for PCB + TSS/TUR

Date: 7/12/2007 Wet/NW
 Weather: Sunny/Clear Breezy 10-20
 Tides:

<u>4.6</u>	@	<u>0859</u>
<u>0.1</u>	@	<u>1458</u>
<u>4.3</u>	@	<u>2117</u>

Monitoring Period:
 From: 0810 To: 1230

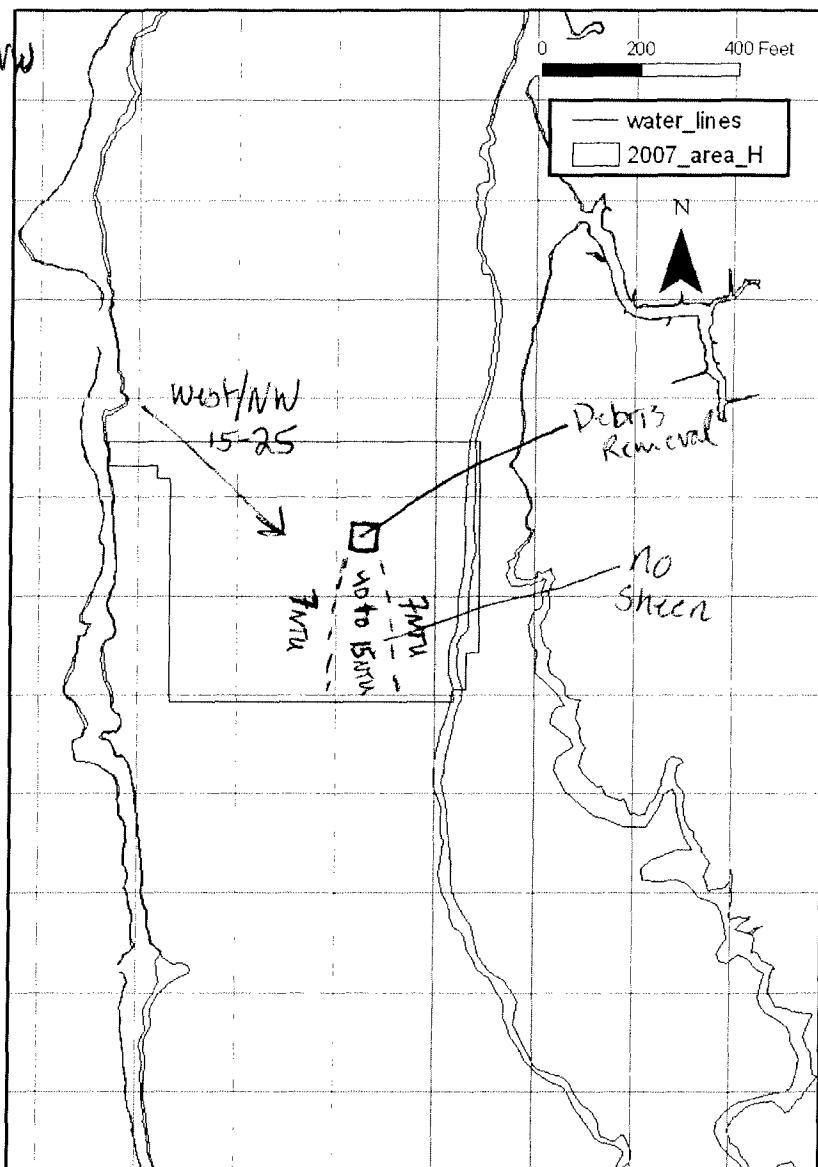
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
AM. No Dredging

Debris Removal (middle East)
 of Area H
0840 Dpt for Area G

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>100' East of DR</u>	<u>4.0 NTU</u>	<u>1.0'</u>



Oil sheen/ Debris:

No sheen

Fish Passage: occasional fish on surface

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____	Turbidity (500ml) _____
Total PCB (1L) _____	Dissolved PCB (2x1L) _____
Toxicity (21L) _____	Metals (500ml) _____

Notes: Thin Band of Turbidity 40 to 15 NTU Associated with debris Removal
Decreasing North to South.

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: M. Walsh

Date: 9/12/2007 west/mid
Weather: Sunny/Clear Breezy 10-26
Tides:
 4.6 @ 0859
 0.1 @ 1458
 4.3 @ 2117

Monitoring Period:

From: 0847 To: 1055

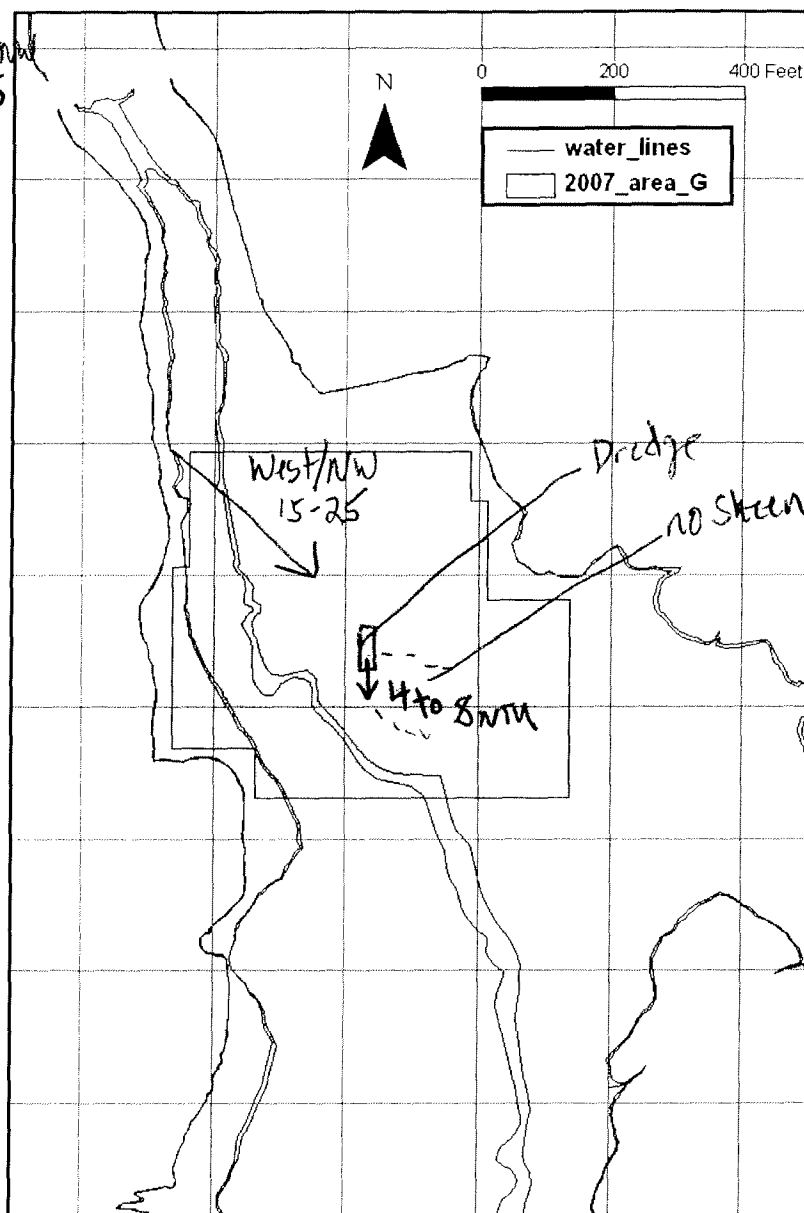
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

middle working North to South

1055 Depart for Area H

Turbidity Summary

[illegible]

Oil sheen/ Debris:

No sheet Associated with Dodge

Fish Passage: Sporadic Fish passage - Occasional Steel Fish

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____

Total PCB (1L) _____

Toxicity (21L) _____

Turbidity (500ml) _____

Dissolved PCB (2x1L) _____

Metals (500ml) _____

Notes: Turbidity from Dredge rarely exceeded Background (7.6 ntu)

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: Mark Walsh

* 5.7 NTU North of Wood St. (1)

Date: 9/14/07
 Weather: Sunny; h-w
 Tides:
0.1' @ 3:28
4.4' @ 10:16
8.4' @ 15:56

Monitoring Period:
 From: 0845 To: 11:15

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Dredging in Area G

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Ref-south	2.8 NTU	0.8 / 100 7.0m
North of Wood St	5.7 NTU	0.7 / 100

Oil sheen/ Debris:

None

Fish Passage: Birds working Above, within 5' south of dredge area

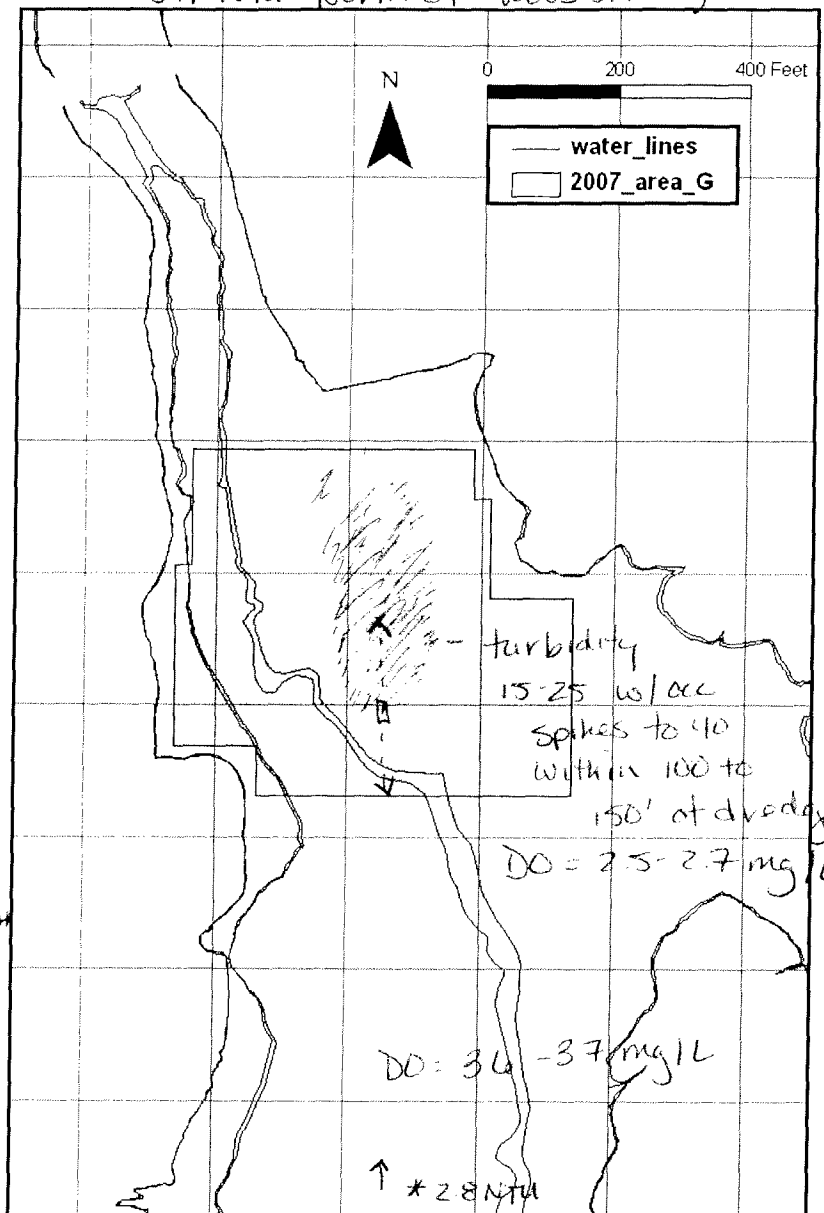
Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: ^① Approximately 850-900' North of Wood St Bridge the DO values dropped to 1.5-1.8 mg/L. Very large numbers of fish present, appeared stressed & were surfacing frequently. Noted some dead fish floating, but numbers were not significant given the large number of total fish in area.

Sampling Crew: J. Hardy, J. Himmer

Chief Scientist Signature: [Signature]



Dredging Location	Debris Removal in H, Dredging in G
Dredging Description	see above
Survey Vessel	RV GALE FORCE
Chief Scientist	Himmer
Sampling Technician	J. HARDY
Vessel Captain	Himmer
Other Personnel	N/A
Weather conditions	Sunny, sixt out of south

Date	9/14/07
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Tide information	
High	
Low	0.1 @ 3:28
High	4.4 @ 10:16
Low	0.4 @ 15:56

[illegible]

* ~880' N of Wood St. DO dropped to ~1.8 at ~1200' DO ~1.2
lots of fish a few ^{dozen} dead ones (bluebacks of juvenile menhaden) fish appear stressed w/ lesions on their sides in front of tail

Date: 9/17/07
 Weather: Sunny, N wind 5-10
 Tides:

0.5'	@	5:01
3.7	@	12:20
0.9'	@	17:42

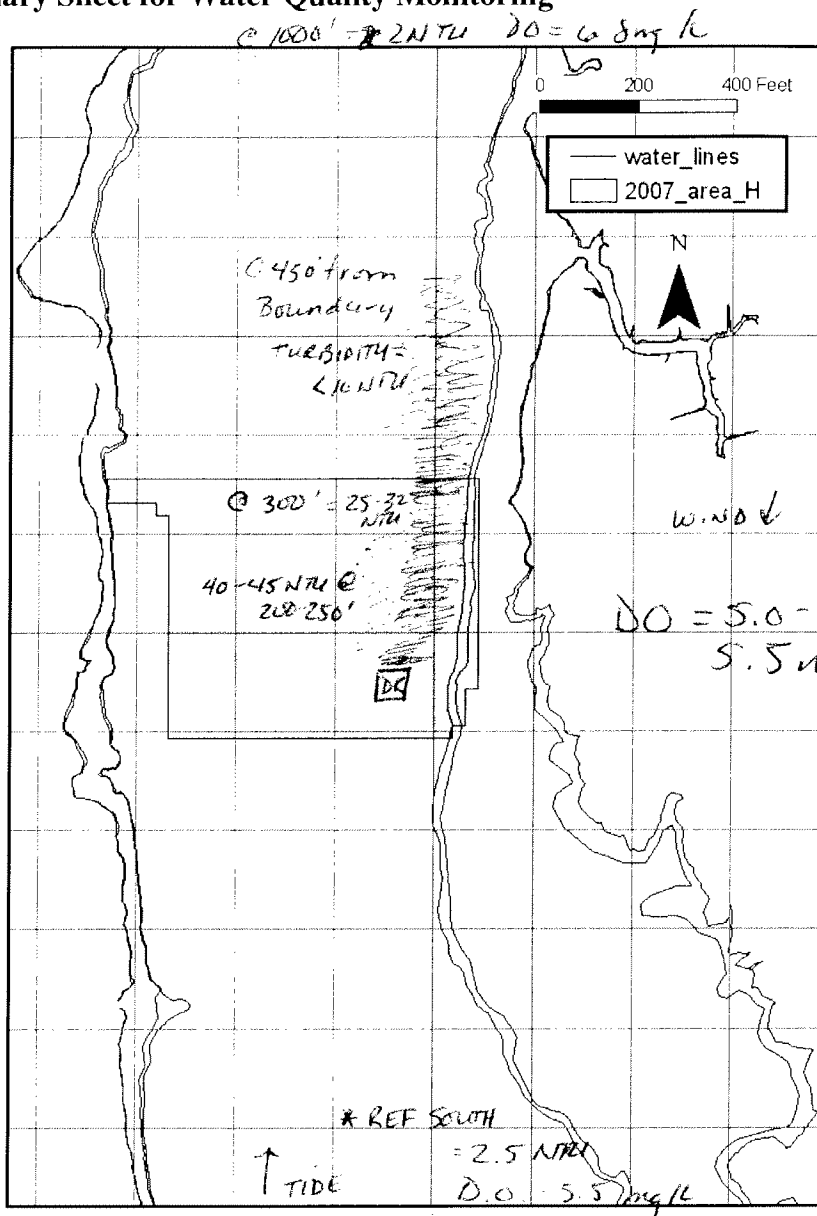
Monitoring Period:
 From: 0900 To: 10:40

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
~~DREDGING~~ : DEBRIS
 REMOVAL

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
S. REF	2.5	0.7 / 5.7
200' from Debris Removal	45 NTU	0.3 / 4.0



Oil sheen/ Debris: None observed

Fish Passage: No evidence of fish damming observed

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Observed narrow plume that hugged eastern shoreline
No exceedences; turbidity @ 300' from debris removal
typically ranged from 25-32 NTU. Diss. Oxy. in area ranged
from 5 to 5.5 mg/L
 Sampling Crew: J. Hardy, T. Hammer
 Chief Scientist Signature: [Signature]



Date: 9/1/07
 Weather: Sunny, some clouds
 Tides:
0.5 @ 5:01
3.7 @ 12:20
0.9 @ 17:42

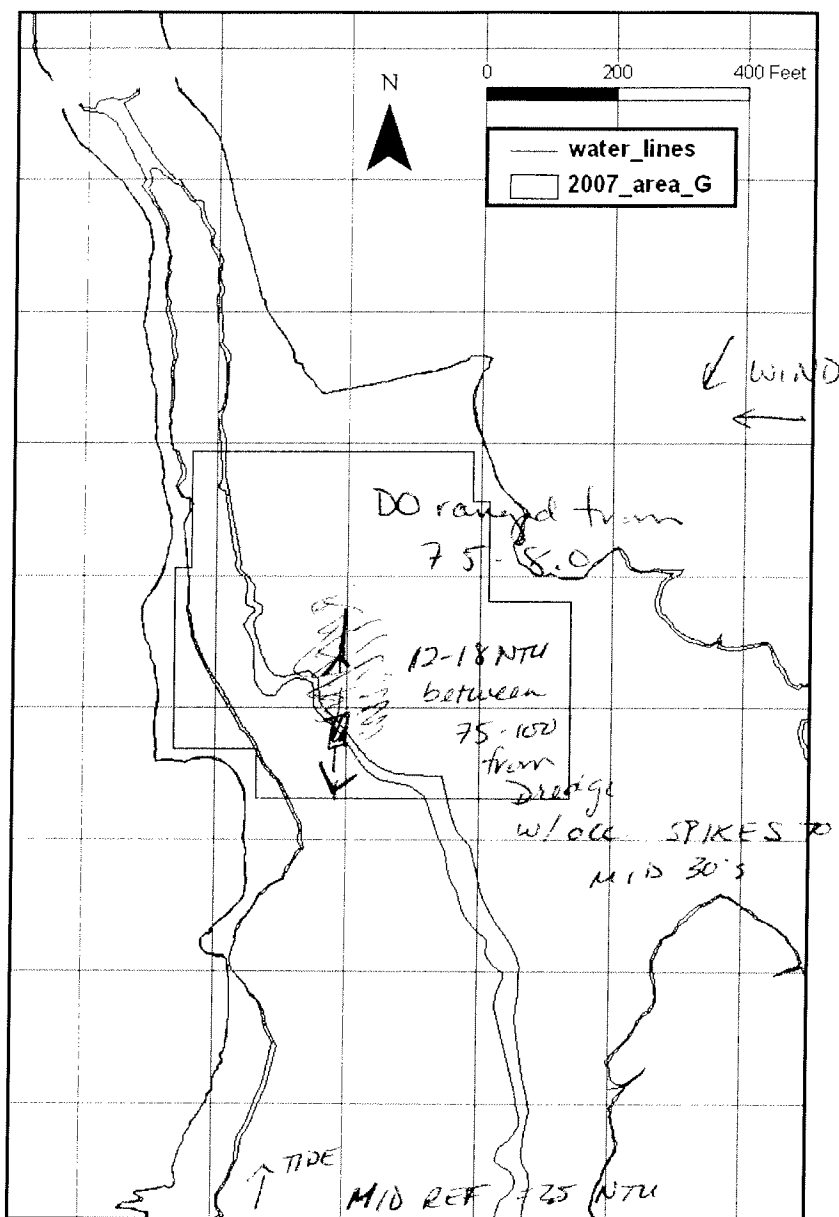
Monitoring Period:
 From: 12:40 To: 12:30

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
DREDGING

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
REF	2.5	0.8'
75' from DREDGE	15	0.8'



Oil sheen/ Debris:
NONE OBSERVED

Fish Passage: LARGE NUMBERS OF BIRDS WORKING ABOVE, WITHIN & SOUTH OF DREDGE UNIT

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: N. of Wood St - Turb = 3525 DO = 3.5

D.O. in Dredge area ranged from 7.5 to 8.0 mg/L; North of Wood St. values dropped to ~3.5 mg/L. Numerous fish seen north of

Sampling Crew: T. Hammer J. Hardy
 Chief Scientist Signature: [Signature]



Weather conditions

AREA #
Dredging / Debris Removal
GALE FORCE
HUMMER
J. HARDY
HUMMER
N/A
SUNNY. N. wind @ 5-10 kts

Date	9/17/07
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High	12:20 +37'
Low	17.42 +0.9'
High	
Low	

[illegible]

Date: 9/19/2007

Weather: overcast/wind North 5-10

Tides:

<u>2.9</u>	@	<u>1:20h</u>
<u>1.0</u>	@	<u>0630</u>
<u>3.4</u>	@	<u>1349</u>

Monitoring Period:

From: 1140 To: 1330

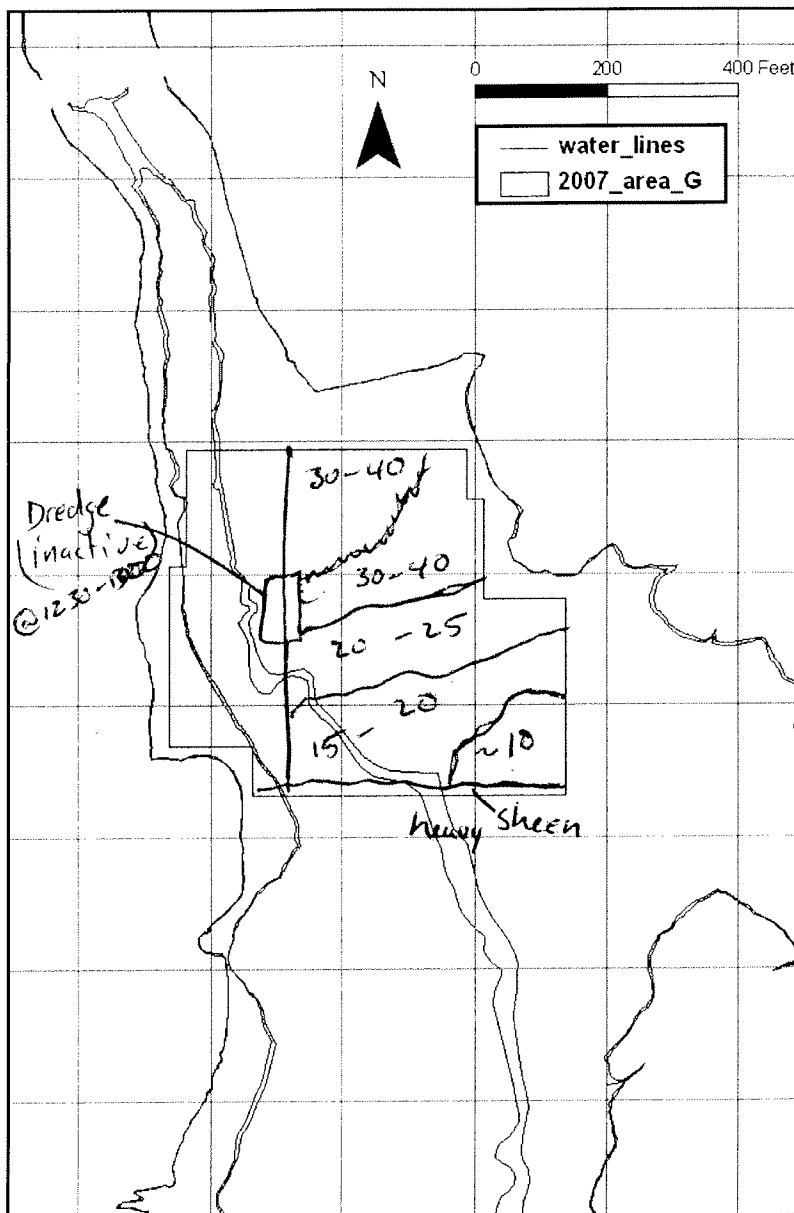
Tidal Stage: HWS Ebb LWS (Flood)

Dredging Activity:

None while Present

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>Central area</u>	<u>16-18</u>	<u>.7/3.8</u>
<u>North of Dredge</u>	<u>30-40</u>	<u>7.0/4.0</u>



Oil sheen/ Debris:

Heavy sheen found only on southern boom - lite sheen throughout area

Fish Passage: fish found in all areas North of Area H + in dredge area

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____	Turbidity (500ml) _____
Total PCB (1L) _____	Dissolved PCB (2x1L) _____
Toxicity (21L) _____	Metals (500ml) _____

Notes:

Sampling Crew: M. Walsh, M. Fitzpatrick

Chief Scientist Signature: M. Walsh

Date: 9/19/07
 Weather: Overcast + wind N 5-10
 Tides:
2.9 @ 1 21
1.0 @ 0630
3.4 @ 1349

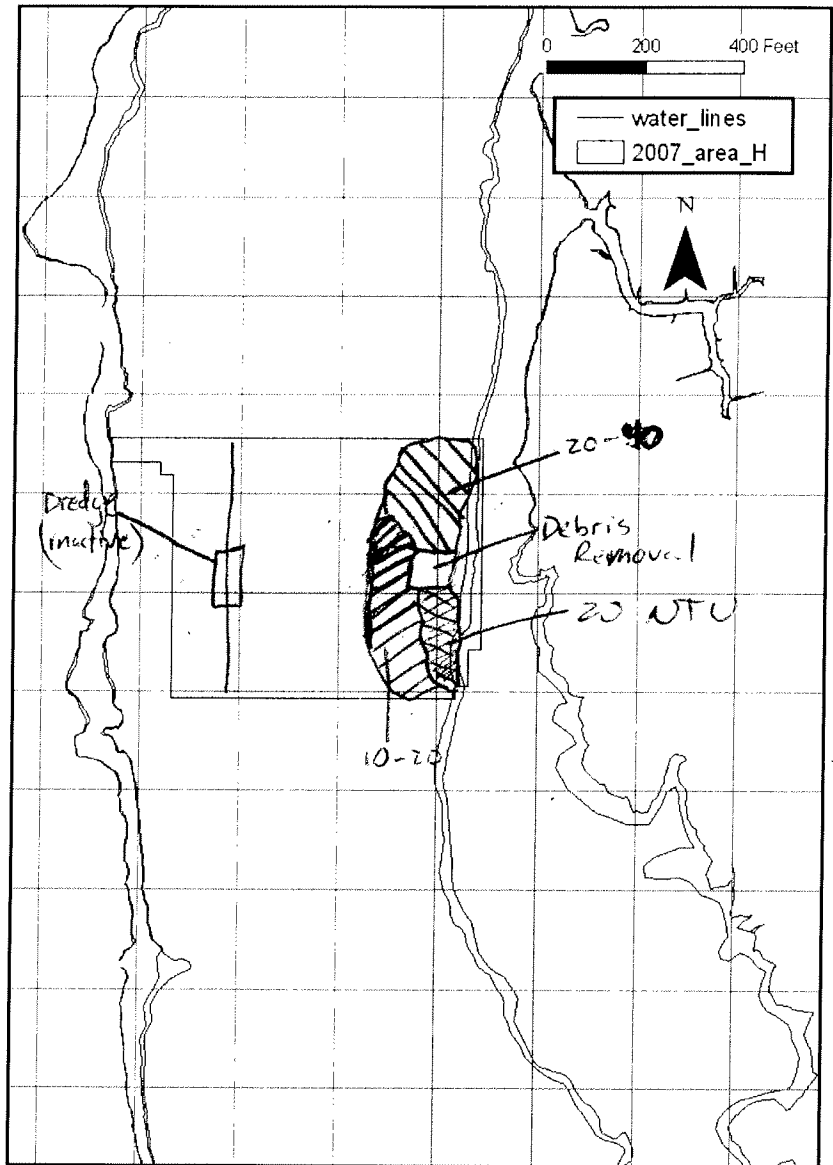
Monitoring Period:
 From: 1140 To: 1330

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
Active Debris removal

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>50-100' South of Debris removal</u>	<u>16-22</u>	<u>.72 / 3.8</u>
<u>50-100' North of Debris removal</u>	<u>20-40</u>	<u>.7 / 4.8</u>



Oil sheen/ Debris:

None

Fish Passage: nothing noted

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes:

Sampling Crew: M. Walsh, M. Fitzpatrick, J. Hardy

Chief Scientist Signature: M. Walsh



Weather conditions

Arm H / not operating
Debris Removal in area G
Gate Force
M Walsh
M.F. Fitzpatrick, S. Hardy
M Walsh
-
overcast

Date	9/19/2007
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High	1.2 2.7 2.7 @ -121
Low	1.0 @ 0630
High	3.4 @ 1349
Low	1.2 @ 2004pm

[illegible]

Date: 9/24/07

Weather: Misty Sunny / wind WNW 5-10

Tides:

9.0 @ 0619
0.3 @ 1209
4.4 @ 1845

Monitoring Period:

From: 0950 To: 1245

Tidal Stage: HWS Ebb LWS Flood

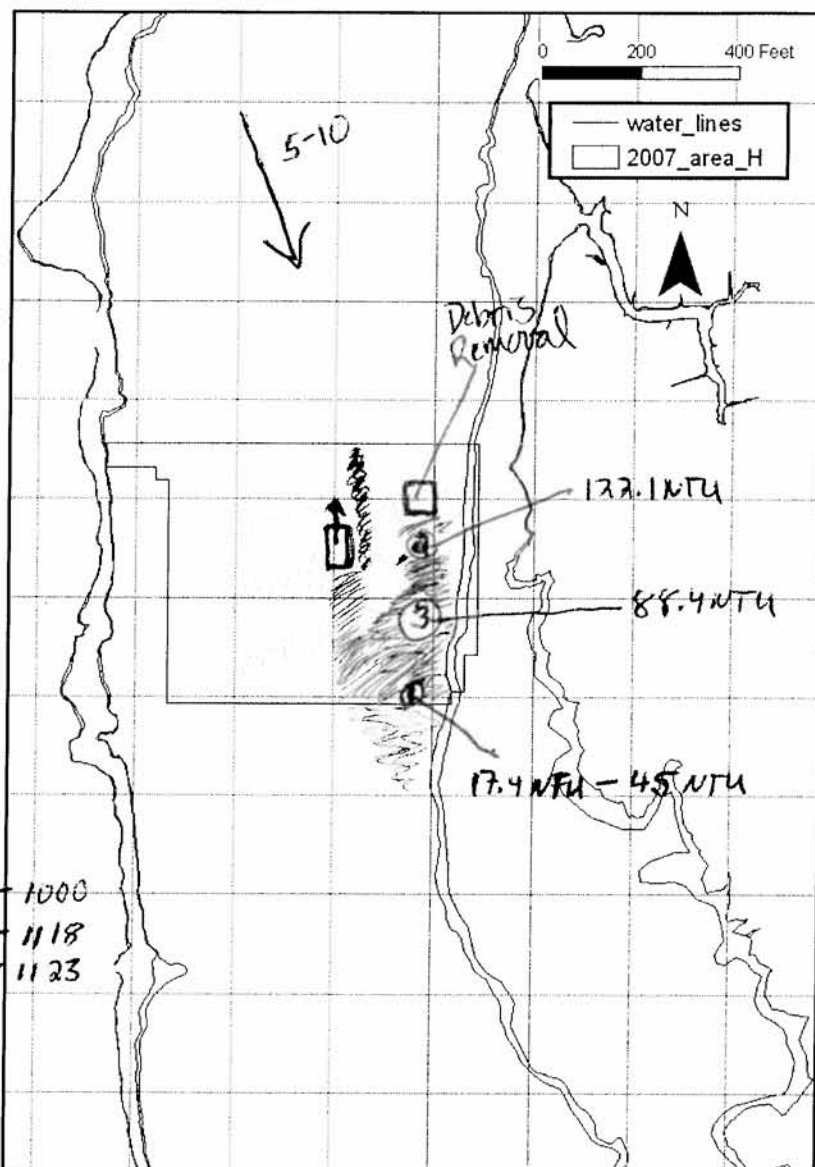
Dredging Activity:

Dredge - Middle working North

Debris Removal NE corner

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)	
① Area H boundary	17.4	.71 / 2.6	1000
② 75' south of DB	132.1	.76 / 2.0	1118
③ 103' south of DB	88.4	.76 / 2.0	1123



Oil sheen/ Debris:

No sheen observed with Debris Removal / Slight sheen associated with Dredge

Fish Passage: occasional fish in surface

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes:

High turbidity close to sources (Dredge/Debris Removal) travelled south with wind and tide. High turbidity associated with support vessel traffic due to astronomically low tide. Diminishing Turbidity away from sources and south of Area ~~H~~ boundary. Elevated NTUs and D.O. also noted south of Area ~~H~~.

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: Michael Walsh

Date: 9/24/07

Weather: mostly sunny / wind NNW 5-10

Tides:

4.0	@	0619
0.3	@	1204
4.4	@	1845

Monitoring Period:

From: 0840 To: 0720

Tidal Stage: HWS (Ebb) LWS Flood

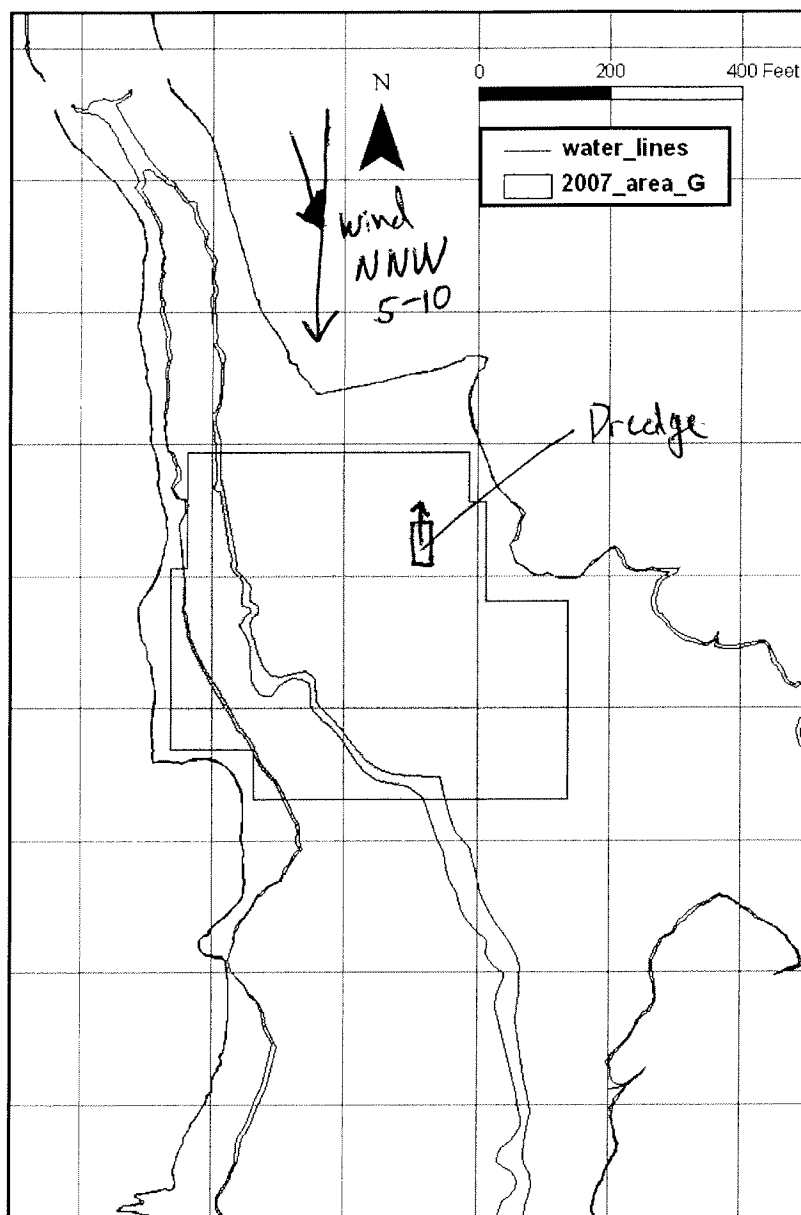
Dredging Activity:

Dredging NE quadrant

- Activity Stopped due to Tide

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
----------	--------------------	----------------------------



Oil sheen/ Debris:

No gum observed

Fish Passage: Occasional Fish on surface

Samples Collected for Laboratory Analysis – Sample IDs:

TSS (1L) _____

Total PCB (1L) _____

Toxicity (21L) _____

Turbidity (500ml) _____

Dissolved PCB (2x1L) _____

Metals (500ml) _____

Notes:

Notes: Dredge Activity stopped due to low Tide. No recordings taken
Needed to retrieve YSI readings before low tide.

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: Michael Welch

Date: 7/25/07
 Weather: Sunny Clear / wind WSW 10-20
 Tides:
4.5 @ 0707
-0.1 @ 1257
4.6 @ 1932

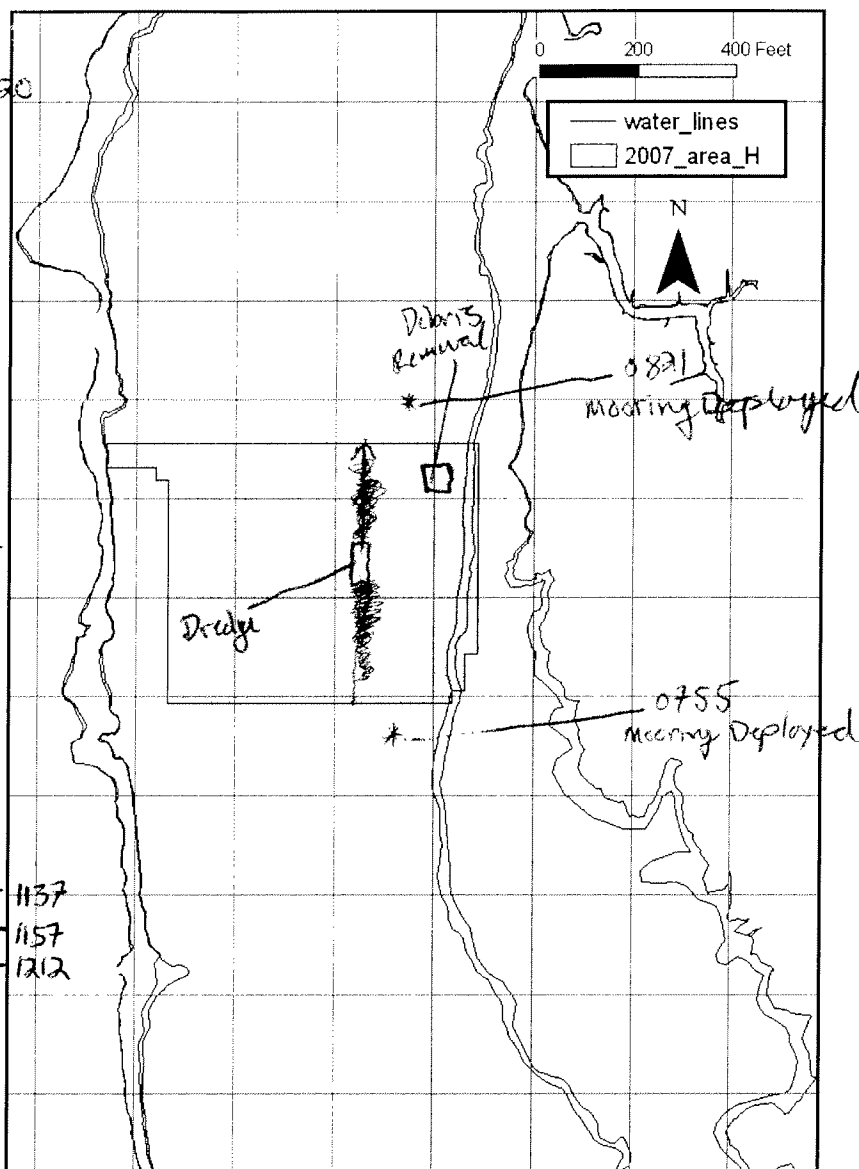
Monitoring Period:
 From: 1006 To: 1230

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:
1006 - 1025 NO Activity
1025 - 1230 Dredging in progress
1006 - 1230 NO DR

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>75' south of Dredge</u>	<u>55-65 NTU</u>	<u>0.81 / 2.6</u> - <u>1137</u>
<u>50' south of Dredge</u>	<u>90-100 NTU</u>	<u>.79 / 2.6</u> - <u>1157</u>
<u>100' south of Dredge</u>	<u>10-20 NTU</u>	<u>.82 / 2.3</u> - <u>1212</u>



Oil sheen/ Debris:

Occasional slight sheen noted around Dredge

Fish Passage: Occasional Fish on Surface

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) WQ-TSS/TUR-001-092507 Turbidity (500ml) WQ-TSS/TUR-001-092507
 Total PCB (1L) / Dissolved PCB (2x1L) /
 Toxicity (21L) / Metals (500ml) /

Notes: Background Turbidity in Dredge and Debris Removal Area 5-10 NTU
 Turbidity readings above background confined to Dredge Path (see Turbidity summary)

Sampling Crew: M. Walsh, J. Hardy
 Chief Scientist Signature: Michael Walsh

Date: 9/25/07

Weather: Sunny / wind - WSW 5-10

Tides:

4.5	@	0707
-0.1	@	1257
4.6	@	1932

Monitoring Period:

From: 0836 To: 1000

Tidal Stage: HWS (Ebb) LWS Flood

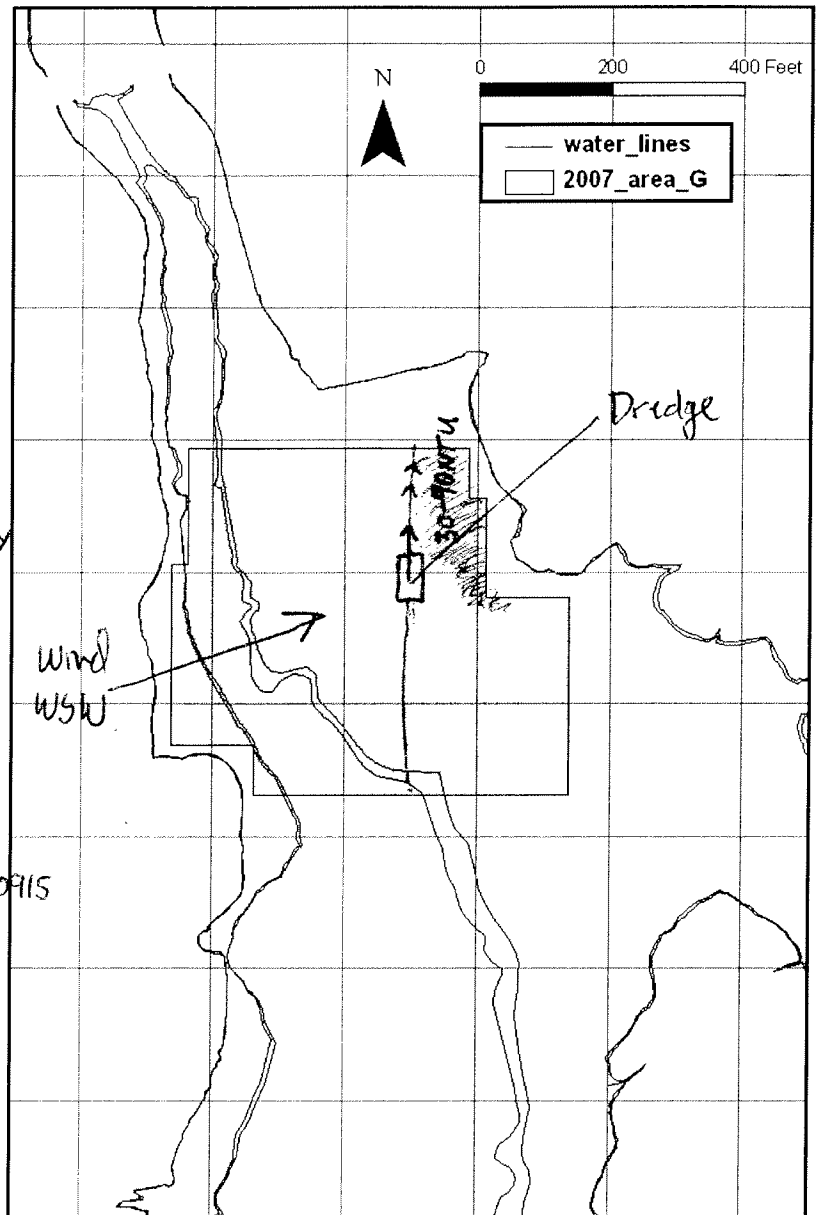
Dredging Activity:

Middle East working North
0836 - 0918 Dredge on Stand By
no activity

0918 - 1000 - Dredge working
1003 Dredge for Area H

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>50' East of Dredge</u>	<u>6-10 NTU</u>	<u>.94 / 3.5' - 0915</u>



Oil sheen/ Debris:

Slight sheen observed on East North East Boundary.

Fish Passage: Occasional Fish on Surface

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L)	Turbidity (500ml)
Total PCB (1L)	Dissolved PCB (2x1L)
Toxicity (21L)	Metals (500ml)

Notes: Dredge working very tight into NE corner - Higher NTU's concentrated to that Area with a slight sheen. NTU values dropped off to background values of 6-10 NTU to the south and east of Dredge.

Sampling Crew: M. Walsh, J. Hardy

Chief Scientist Signature: Michael Walsh

Water Quality Monitoring

In situ Data Field Form

Dredging Location	Area G / Debris Removal Area H
Dredging Description	Middle East Working North / Debris Removal NE Corner
Survey Vessel	Gale Force
Chief Scientist	M. Walsh
Sampling Technician	J. Hardy
Vessel Captain	M. Walsh
Other Personnel	-
Weather conditions	Sunny Clear / wind WSW 5-10

Date	9/25/07
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Tide information	
High	4.5 @ 0707
Low	-0.1 @ 1257
High	4.6 @ 1932
Low	

[illegible]

Date: 10/1/07
 Weather: Sunny Cloud/Colm / 35E
 Tides:
 -0.2 @ 0458
 4.5 @ 1707
 0.3 @ 1759

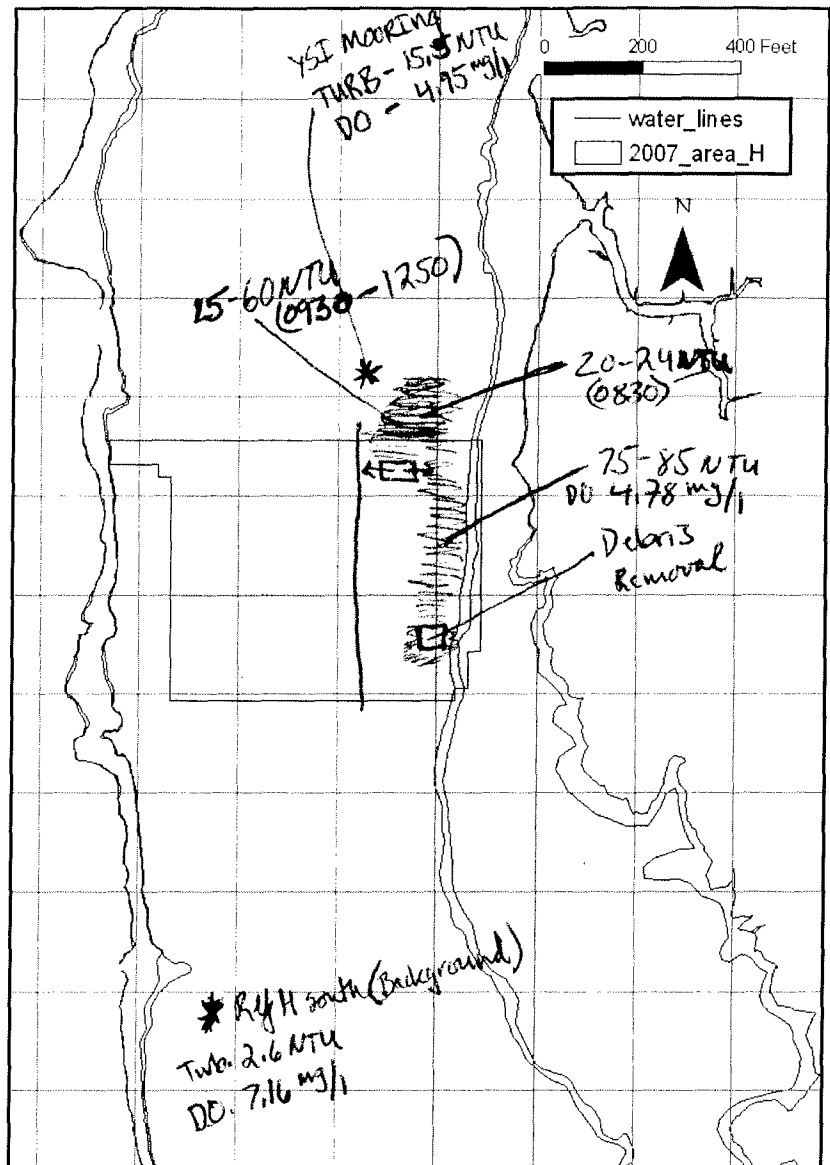
Monitoring Period:
 From: 0810 To: 1310

Tidal Stage: HWS Ebb LWS (Flood)

Dredging Activity:
 0845 - Dredging Inactive to 0915
 0915 - Dredging in progress 1245
 0810 DR in Progress to 1030

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
<u>150' N of DR</u>	<u>75.6 NTU</u>	<u>0.77/2.5'</u>
<u>50' N of Area H</u>	<u>20.9</u>	<u>0.73/4.5'</u>



Oil sheen/ Debris:
No noticeable sheen

Fish Passage: Many Fish on Surface in all Areas. There appeared to be no effects from Debris Removal and Dredging to passage of fish.

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Turbidity Range of 75-85 NTU confined to within Dredge Area and in close proximity to Debris Removal and Dredge. North of Dredge Area in close proximity to Dredge, short lived plumes of 20-60 NTU were monitored. Counts dropped off quickly to just above background. Dissolved Oxygen levels Range 4.5-6 mg/l throughout dredge area.

Sampling Crew: M. Walsh, J. Markin
 Chief Scientist Signature: M. Walsh



Date	10/1/07
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High	
Low	-0.2 @ 0458
High	4.5 @ 1207
Low	5.3 @ 1759

[illegible]

* WOOD ST. Bridge R/L
TURB = 7.0 NTU
DO = 9.21 mg/l

Battelle

Daily Field Summary Sheet for Water Quality Monitoring

Date: 10/2/07

Weather: mostly cloudy / wind calm

Tides:

0.2	@	0552
4.2	@	1309
0.6	@	1719

Monitoring Period:

From: 0845 To: 1940

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Dredge East to West 35' south of Area H north Boundary

Debris Removal Southeast corner of Area H

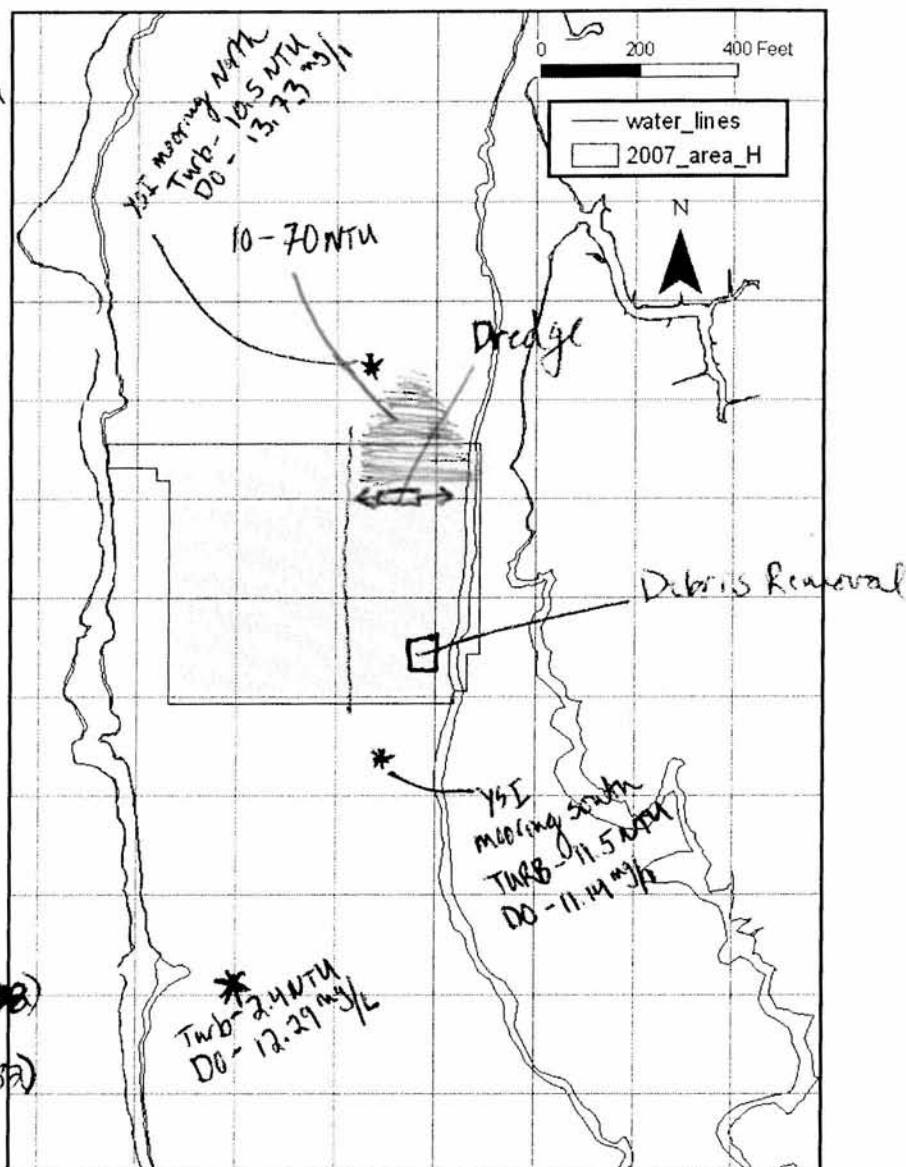
Debris Removal Done

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
130' south of Area H	3.7	1.2 / 3.5
130' north of Area H	32.1	1.2 / 3.0

Morning North Retreat 10.5 0.8 / 5.5' (1403)

Morning South Retreat 11.5 0.8 / 6.0' (1432)



Oil sheen/ Debris:

No sheen observed

Fish Passage: Large Schools of Fish observed in all areas of River. No apparent obstruction from Dredging or Debris Removal

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L)	Turbidity (500ml)
Total PCB (1L)	Dissolved PCB (2x1L)
Toxicity (21L)	Metals (500ml)

Notes: Due to inaccessibility to Dredge Area H, new work area, WQ was not conducted in close proximity to sources. However, Both Dredge and Debris Removal were working edges of Boundary. Turbidity values along Area H North Boundary ranged between just above background NTUs (10 NTU) to (70 NTU) which corresponded with dredge pass from west to east. Elevated NTUs (70 NTU) were observed due to support vessels. Higher NTUs dropped off quickly with distance.

Sampling Crew: M. Walsh, M. Miller

Chief Scientist Signature: M. Walsh

YSE morning Retreat Area H
Sediment Taps Deployed North of Area 6

Water Quality Monitoring

In situ Data Field Form

Dredging Location	Area H
Dredging Description	Northeast corner Area H / Debris Removal Southeast corner Area H
Survey Vessel	Gale Force
Chief Scientist	M. Walsh
Sampling Technician	M. McKee
Vessel Captain	M. Walsh
Other Personnel	—
Weather conditions	Partly Cloudy / wind calm

Date	10/2/07
Page	of

Tide information	
High	
Low	0.52 ^{0.51} @ 05:52 ^{new} 0.
High	4.2 @ 13:09
Low	0.6 @ 19:19

[illegible]

Date: 10/3/07

Weather: Foggy / Windy calm/SE 5

Tides:

0.6	@	0700
3.9	@	1415
0.7	@	2122

Monitoring Period:

From: 0855 To: 1230

Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

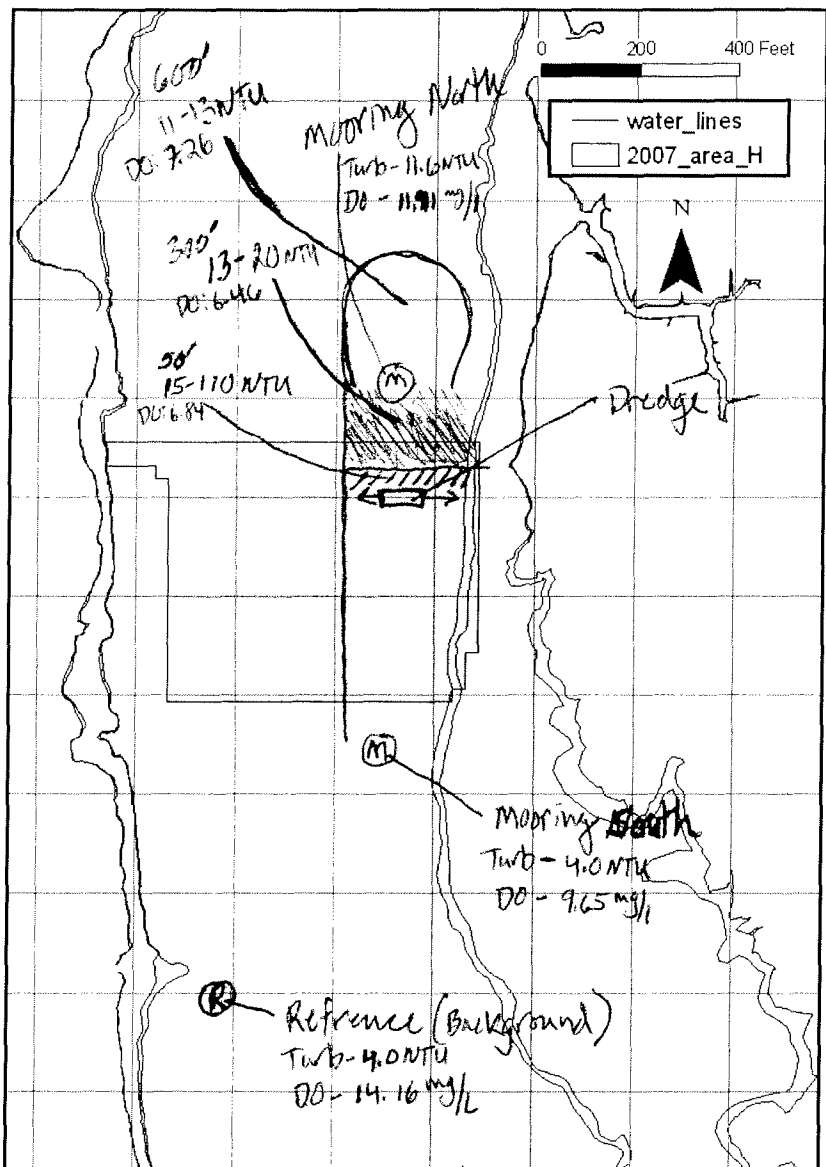
Area 14 Middle North work East to West

- Debris Removal finished

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
50'	15-110	1.95 / 3.8
300'	13-20	2.00 / 3.8
600'	11-13	1.95 / 4.8

(M) 130' south boundary	4.0	0.70 / 4.0
(M) 130' north boundary	11.6	0.71 / 3.0
(R) 600' south boundary	4.0	0.74 / 4.9



Oil sheen/ Debris:

Schools of Fish Observed within dredge area and outside dredge Area. No obstruction observed from Dredging Activities

Fish Passage:

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) WQ-TSS/TUR-XXX-100307	Turbidity (500ml) WQ-TSS/TUR-XXX-100307
Total PCB (1L) WQ-PCB-XXX-100307	Dissolved PCB (2x1L) WQ-DCP-XXX-100307
Toxicity (21L) WQ-TOX-XXX-100307	Metals (500ml) WQ-MET-XXX-100307

Notes: 15-110 NTU Turbidity readings in close proximity to dredge ~50 feet. Broad range in readings due to stop and go activity of Dredge. These broad ranges continued but diminished with distance from Dredge as seen at 300' with 11.6-20 NTU. At 600' from dredge ranges tight were closer and diminished again (11-13 NTU). Dissolved Oxygen values can be seen on map.

Sampling Crew: M. Walsh, J. Hardy
Chief Scientist Signature: Mike Walsh



Water Quality Monitoring

In situ Data Field Form

Dredging Location	Area H
Dredging Description	Middle North Working West to East
Survey Vessel	Grate Force
Chief Scientist	M. Walsh
Sampling Technician	J. Hardy
Vessel Captain	M. Walsh
Other Personnel	—
Weather conditions	Foggy / wind calm / SSE 5

Date	10 / 3 / 07
Page	of

Tide information	
High	
Low	0.6 @ 0700
High	3.9 @ 1415
Low	0.7 @ 2122

[illegible]

Date: 10/8/07

Weather: overcast/rain/amel 5-15 SSW

Tides:

3.9 @ 0626

0.2 @ 1311

4.0 @ 1846

Monitoring Period:

From: 0820 To: 1245

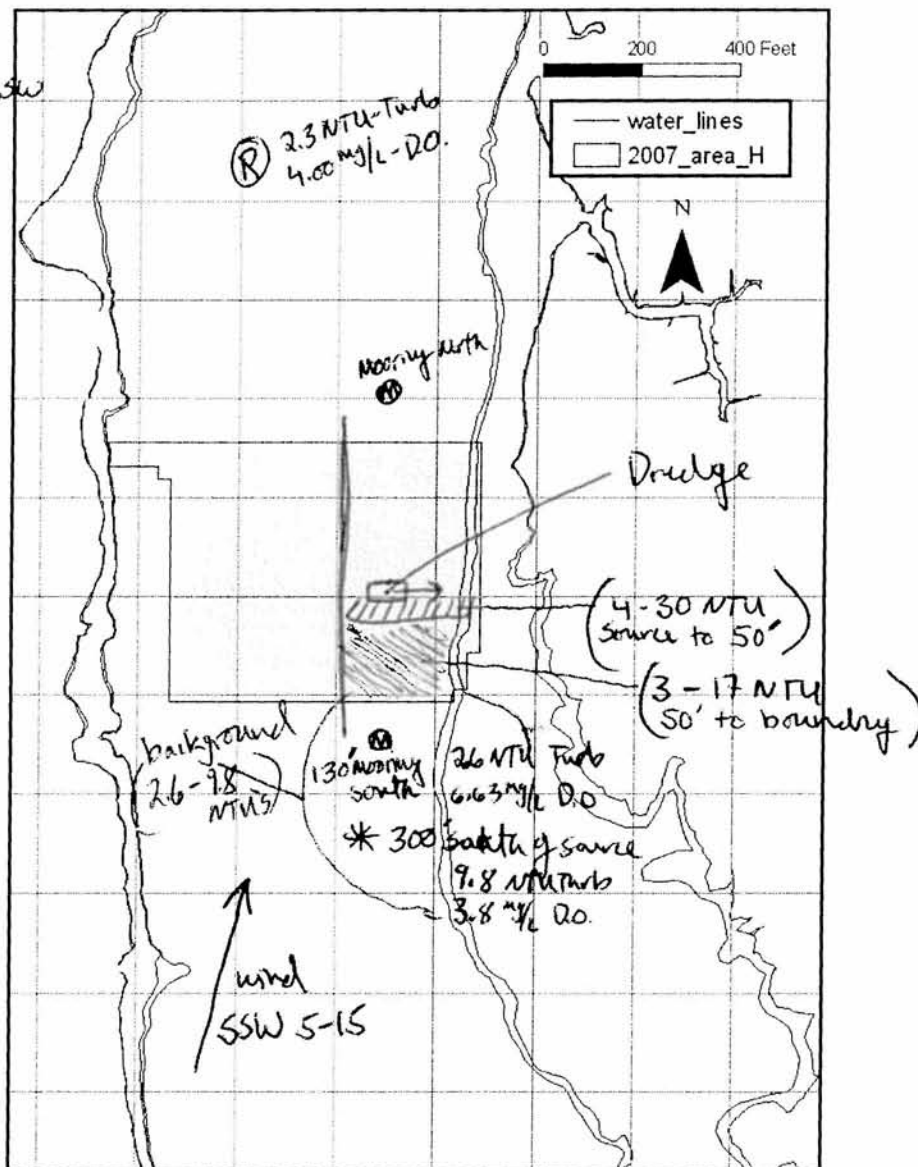
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Working middle west to East

Turbidity Summary

Location	Turbidity (NTU)	Sensor/water Depth (ft)
Ref North	2.3	0.4 / 5.9
* 300' south of source	9.8	0.8 / 4.9
600' south of source	2.5	0.7 / 4.0
(M) 701 mooring south	2.6	0.8 / 6.4



Oil sheen/ Debris:

occasional spotty sheen associated with dredge activity

Fish Passage: Fishes observed in all areas/No apparent obstruction from dredge activity

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L) _____ Turbidity (500ml) _____
 Total PCB (1L) _____ Dissolved PCB (2x1L) _____
 Toxicity (21L) _____ Metals (500ml) _____

Notes: Overall Turbidity quite low today. An average of 4-30 NTU was observed in close proximity to dredge (source) with an occasional higher spike to 50 NTU. From 50' to the dredge boundary Turbidity ranged from 3-17 NTUs. Turbidity values dropped off to background and just above beyond the 130'-300' mark (2.5-9.8 NTU).

Sampling Crew: M. Walsh, T. H. Miller

Chief Scientist Signature: M. Walsh

Dissolved Oxygen ranged between 3.5-4 mg/L inside the dredge area to 3-6.6 mg/L outside the dredge area.



Date	10/8/07
Page	of

High	3.9 @ 0626
Low	0.2 @ 1311
High	4.0 @ 1846
Low	

[illegible]

Date: 10/9/07

Weather: Puffy Cloudy / wind N 10-15

Tides:

4.1	@	0706
0.2	@	1337
4.0	@	1926

Monitoring Period:

From: 0845 To: 1345

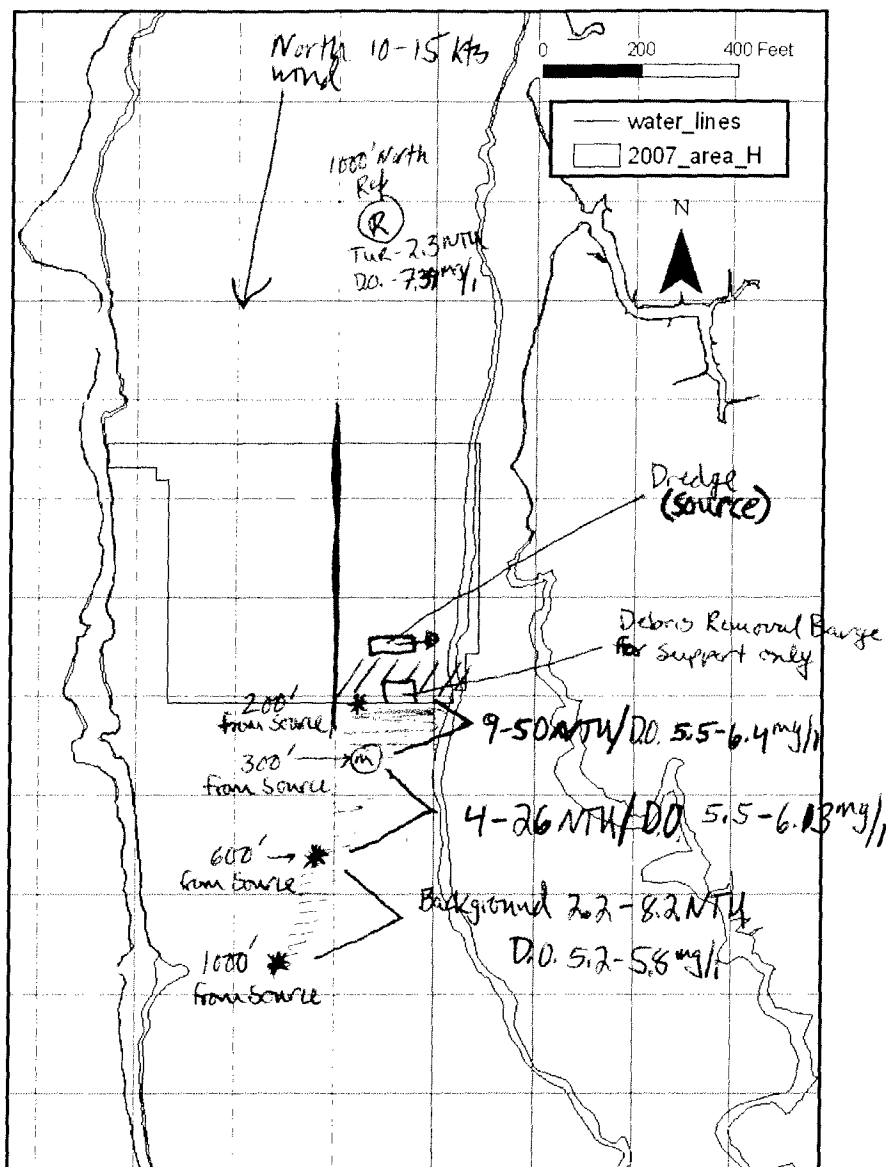
Tidal Stage: HWS Ebb LWS Flood

Dredging Activity:

Middle South working west to East
- Debris Removal Barge for support

Turbidity Summary

Location (REFERENCE)	Turbidity (NTU)	Sensor/water Depth (ft)
1000' North of source	2.3	1.03 / 4.8
Area H Barge 200' South of source	39.8	1.08 / 3.9
moving 300' south of source	26.4	1.06 / 3.8
600' south of source	8.2	1.07 / 5.4
1000' South of source	2.2	1.04 / 7.2



Oil sheen/ Debris:

Occasional spotty sheen

Fish Passage: Occasional Fish on Surface / No obvious obstruction from Dredging Activity

Samples Collected for Laboratory Analysis - Sample IDs:

TSS (1L)	Turbidity (500ml)
Total PCB (1L)	Dissolved PCB (2x1L)
Toxicity (21L)	Metals (500ml)

Notes: - Sampling crew did not enter Dredge area due to close proximity of Dredges, Debris Removal and Support Vessels. Highest Turbidity readings observed between 200' and 300' downstream. Arranges between 9-30 NTU with spikes to 50 NTU depending on dredge passage location. Outside of 300' Turbidity dropped off to just above background (4 NTU) with spikes to the mid twenties (26 NTU). This too was dependent on dredge location.

Sampling Crew: M Walsh, M McKee

Chief Scientist Signature: Mike Walsh on dredge location.

Dredging Location Area H
Dredging Description Middle South working West to East / Debris Removal Barge Support Only
Survey Vessel Gale Force
Chief Scientist M. Walsh
Sampling Technician M. McKee
Vessel Captain M. Walsh
Other Personnel -
Weather conditions Partly Cloudy / wind N 10-15

Date 10/19/07
Page of

Tide information
High 4.1 @ 0706
Low 0.2 @ 1337
High 4.0 @ 1926
Low

	Station Number	Time	Latitude	Longitude	Water depth	Sample Depth	Turbidity	Salinity	DO	Temp	Notes
1000' North of Source	Ref North	0951	2705736.68	815613.24	4.8	1.03	2.3	30.52	2.39	19.34	Ph 7.29
300' south of Source		1017	2704228.30	815499.11	5.2	0.98	13.4	31.03	6.39	19.53	Ph 7.43
600' south of Source		1030	2703920.66	815444.69	6.1	1.13	4.0	31.00	6.13	19.51	Ph 7.46
200' south of Source (boundary)	1137 1201		2704316.30	815447.20	3.9	1.08	39.8	30.71	5.60	19.58	Ph 7.50
300' south of Source			2704221.39	815497.76	3.8	1.06	26.4	30.75	5.89	19.56	Ph 7.50 morning site
600' south of Source		1152	2703927.61	815405.89	5.4	1.07	2.2	30.78	5.85	19.54	Ph 7.49
1000' feet South of Source		1146	2703526.61	815360.88	7.2	1.04	2.2	30.71	5.26	19.48	Ph 7.44

} mammal dredge
 Activity

Belleville, Acushnet River, Buzzards Bay, Massachusetts Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08) Units are feet Mark level: 0.00				
Tidal Stage	Date	Time	Time Zone	Tidal Height
High Tide:	8/6/2007	2:13	EDT	3.6
Low Tide:	8/6/2007	7:38	EDT	0.2
High Tide:	8/6/2007	14:51	EDT	4.5
Low Tide:	8/6/2007	20:57	EDT	0.7
High Tide:	8/7/2007	3:18	EDT	3.4
Low Tide:	8/7/2007	8:44	EDT	0.4
High Tide:	8/7/2007	15:55	EDT	4.5
Low Tide:	8/7/2007	22:25	EDT	0.7
High Tide:	8/8/2007	4:23	EDT	3.4
Low Tide:	8/8/2007	10:00	EDT	0.4
High Tide:	8/8/2007	16:57	EDT	4.6
Low Tide:	8/8/2007	23:42	EDT	0.5
High Tide:	8/9/2007	5:25	EDT	3.6
Low Tide:	8/9/2007	11:16	EDT	0.4
High Tide:	8/9/2007	17:55	EDT	4.7
Low Tide:	8/10/2007	0:40	EDT	0.4
High Tide:	8/10/2007	6:22	EDT	3.8
Low Tide:	8/10/2007	12:23	EDT	0.2
High Tide:	8/10/2007	18:49	EDT	4.8
Low Tide:	8/11/2007	1:28	EDT	0.2
High Tide:	8/11/2007	7:13	EDT	4
Low Tide:	8/11/2007	13:18	EDT	0.1
High Tide:	8/11/2007	19:38	EDT	4.8
Low Tide:	8/12/2007	2:07	EDT	0.1
High Tide:	8/12/2007	8:01	EDT	4.2
Low Tide:	8/12/2007	14:05	EDT	0
High Tide:	8/12/2007	20:23	EDT	4.8
Low Tide:	8/13/2007	2:42	EDT	0
High Tide:	8/13/2007	8:45	EDT	4.4
Low Tide:	8/13/2007	14:47	EDT	0
High Tide:	8/13/2007	21:06	EDT	4.7
Low Tide:	8/14/2007	3:13	EDT	0
High Tide:	8/14/2007	9:28	EDT	4.4
Low Tide:	8/14/2007	15:24	EDT	0.1
High Tide:	8/14/2007	21:46	EDT	4.5
Low Tide:	8/15/2007	3:42	EDT	0.1
High Tide:	8/15/2007	10:09	EDT	4.4
Low Tide:	8/15/2007	15:58	EDT	0.3
High Tide:	8/15/2007	22:26	EDT	4.2
Low Tide:	8/16/2007	4:09	EDT	0.2
High Tide:	8/16/2007	10:50	EDT	4.3
Low Tide:	8/16/2007	16:31	EDT	0.4
High Tide:	8/16/2007	23:06	EDT	3.9

Belleville, Acushnet River, Buzzards Bay, Massachusetts Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08) Units are feet Mark level: 0.00				
Tidal Stage	Date	Time	Time Zone	Tidal Height
Low Tide:	8/17/2007	4:37	EDT	0.3
High Tide:	8/17/2007	11:32	EDT	4.1
Low Tide:	8/17/2007	17:04	EDT	0.6
High Tide:	8/17/2007	23:46	EDT	3.6
Low Tide:	8/18/2007	5:08	EDT	0.4
High Tide:	8/18/2007	12:15	EDT	3.9
Low Tide:	8/18/2007	17:40	EDT	0.9
High Tide:	8/19/2007	0:29	EDT	3.3
Low Tide:	8/19/2007	5:42	EDT	0.6
High Tide:	8/19/2007	13:02	EDT	3.7
Low Tide:	8/19/2007	18:21	EDT	1.1
High Tide:	8/20/2007	1:18	EDT	3.1
Low Tide:	8/20/2007	6:21	EDT	0.7
High Tide:	8/20/2007	13:54	EDT	3.6
Low Tide:	8/20/2007	19:10	EDT	1.2
High Tide:	8/21/2007	2:14	EDT	2.9
Low Tide:	8/21/2007	7:08	EDT	0.9
High Tide:	8/21/2007	14:51	EDT	3.6
Low Tide:	8/21/2007	20:11	EDT	1.3
High Tide:	8/22/2007	3:16	EDT	2.8
Low Tide:	8/22/2007	8:06	EDT	1
High Tide:	8/22/2007	15:50	EDT	3.6
Low Tide:	8/22/2007	21:25	EDT	1.3
High Tide:	8/23/2007	4:18	EDT	2.9
Low Tide:	8/23/2007	9:13	EDT	1
High Tide:	8/23/2007	16:47	EDT	3.8
Low Tide:	8/23/2007	22:42	EDT	1.1
High Tide:	8/24/2007	5:15	EDT	3.1
Low Tide:	8/24/2007	10:25	EDT	0.8
High Tide:	8/24/2007	17:40	EDT	4.1
Low Tide:	8/24/2007	23:42	EDT	0.7
High Tide:	8/25/2007	6:07	EDT	3.5
Low Tide:	8/25/2007	11:31	EDT	0.6
High Tide:	8/25/2007	18:29	EDT	4.4
Low Tide:	8/26/2007	0:29	EDT	0.4
High Tide:	8/26/2007	6:54	EDT	3.9
Low Tide:	8/26/2007	12:27	EDT	0.2
High Tide:	8/26/2007	19:15	EDT	4.6
Low Tide:	8/27/2007	1:11	EDT	0.1
High Tide:	8/27/2007	7:39	EDT	4.3
Low Tide:	8/27/2007	13:18	EDT	-0.1
High Tide:	8/27/2007	19:59	EDT	4.8
Low Tide:	8/28/2007	1:52	EDT	-0.2

Belleville, Acushnet River, Buzzards Bay, Massachusetts Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08) Units are feet Mark level: 0.00				
Tidal Stage	Date	Time	Time Zone	Tidal Height
High Tide:	8/28/2007	8:23	EDT	4.6
Low Tide:	8/28/2007	14:07	EDT	-0.3
High Tide:	8/28/2007	20:44	EDT	4.9
Low Tide:	8/29/2007	2:33	EDT	-0.4
High Tide:	8/29/2007	9:08	EDT	4.9
Low Tide:	8/29/2007	14:54	EDT	-0.5
High Tide:	8/29/2007	21:29	EDT	4.8
Low Tide:	8/30/2007	3:14	EDT	-0.6
High Tide:	8/30/2007	9:54	EDT	5
Low Tide:	8/30/2007	15:42	EDT	-0.5
High Tide:	8/30/2007	22:15	EDT	4.7
Low Tide:	8/31/2007	3:56	EDT	-0.5
High Tide:	8/31/2007	10:41	EDT	5.1
Low Tide:	8/31/2007	16:31	EDT	-0.3
High Tide:	8/31/2007	23:03	EDT	4.4
Low Tide:	9/1/2007	4:40	EDT	-0.4
High Tide:	9/1/2007	11:32	EDT	5
Low Tide:	9/1/2007	17:22	EDT	-0.1
High Tide:	9/1/2007	23:55	EDT	4.1
Low Tide:	9/2/2007	5:26	EDT	-0.2
High Tide:	9/2/2007	12:27	EDT	4.8
Low Tide:	9/2/2007	18:19	EDT	0.2
High Tide:	9/3/2007	0:52	EDT	3.7
Low Tide:	9/3/2007	6:18	EDT	0.1
High Tide:	9/3/2007	13:27	EDT	4.6
Low Tide:	9/3/2007	19:27	EDT	0.6
High Tide:	9/4/2007	1:55	EDT	3.5
Low Tide:	9/4/2007	7:19	EDT	0.4
High Tide:	9/4/2007	14:32	EDT	4.4
Low Tide:	9/4/2007	20:53	EDT	0.8
High Tide:	9/5/2007	3:04	EDT	3.3
Low Tide:	9/5/2007	8:35	EDT	0.6
High Tide:	9/5/2007	15:40	EDT	4.3
Low Tide:	9/5/2007	22:29	EDT	0.7
High Tide:	9/6/2007	4:11	EDT	3.4
Low Tide:	9/6/2007	10:07	EDT	0.6
High Tide:	9/6/2007	16:43	EDT	4.3
Low Tide:	9/6/2007	23:40	EDT	0.6
High Tide:	9/7/2007	5:12	EDT	3.6
Low Tide:	9/7/2007	11:29	EDT	0.5
High Tide:	9/7/2007	17:41	EDT	4.4
Low Tide:	9/8/2007	0:31	EDT	0.4
High Tide:	9/8/2007	6:06	EDT	3.9

Belleville, Acushnet River, Buzzards Bay, Massachusetts Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08) Units are feet Mark level: 0.00				
Tidal Stage	Date	Time	Time Zone	Tidal Height
Low Tide:	9/8/2007	12:29	EDT	0.3
High Tide:	9/8/2007	18:32	EDT	4.5
Low Tide:	9/9/2007	1:11	EDT	0.3
High Tide:	9/9/2007	6:55	EDT	4.1
Low Tide:	9/9/2007	13:15	EDT	0.2
High Tide:	9/9/2007	19:18	EDT	4.5
Low Tide:	9/10/2007	1:44	EDT	0.2
High Tide:	9/10/2007	7:38	EDT	4.4
Low Tide:	9/10/2007	13:54	EDT	0.1
High Tide:	9/10/2007	19:59	EDT	4.5
Low Tide:	9/11/2007	2:11	EDT	0.1
High Tide:	9/11/2007	8:19	EDT	4.5
Low Tide:	9/11/2007	14:28	EDT	0.1
High Tide:	9/11/2007	20:39	EDT	4.4
Low Tide:	9/12/2007	2:37	EDT	0.1
High Tide:	9/12/2007	8:59	EDT	4.6
Low Tide:	9/12/2007	14:58	EDT	0.1
High Tide:	9/12/2007	21:17	EDT	4.3
Low Tide:	9/13/2007	3:02	EDT	0.1
High Tide:	9/13/2007	9:37	EDT	4.5
Low Tide:	9/13/2007	15:27	EDT	0.2
High Tide:	9/13/2007	21:54	EDT	4.1
Low Tide:	9/14/2007	3:28	EDT	0.1
High Tide:	9/14/2007	10:16	EDT	4.4
Low Tide:	9/14/2007	15:56	EDT	0.4
High Tide:	9/14/2007	22:31	EDT	3.8
Low Tide:	9/15/2007	3:56	EDT	0.2
High Tide:	9/15/2007	10:55	EDT	4.2
Low Tide:	9/15/2007	16:28	EDT	0.5
High Tide:	9/15/2007	23:10	EDT	3.5
Low Tide:	9/16/2007	4:26	EDT	0.4
High Tide:	9/16/2007	11:35	EDT	4
Low Tide:	9/16/2007	17:02	EDT	0.7
High Tide:	9/16/2007	23:52	EDT	3.2
Low Tide:	9/17/2007	5:01	EDT	0.5
High Tide:	9/17/2007	12:20	EDT	3.7
Low Tide:	9/17/2007	17:42	EDT	0.9
High Tide:	9/18/2007	0:39	EDT	3
Low Tide:	9/18/2007	5:41	EDT	0.7
High Tide:	9/18/2007	13:11	EDT	3.6
Low Tide:	9/18/2007	18:29	EDT	1.1
High Tide:	9/19/2007	1:37	EDT	2.8
Low Tide:	9/19/2007	6:29	EDT	0.9

Belleville, Acushnet River, Buzzards Bay, Massachusetts Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08) Units are feet Mark level: 0.00				
Tidal Stage	Date	Time	Time Zone	Tidal Height
High Tide:	9/19/2007	14:10	EDT	3.5
Low Tide:	9/19/2007	19:28	EDT	1.2
High Tide:	9/20/2007	2:42	EDT	2.8
Low Tide:	9/20/2007	7:29	EDT	1
High Tide:	9/20/2007	15:13	EDT	3.5
Low Tide:	9/20/2007	20:40	EDT	1.1
High Tide:	9/21/2007	3:47	EDT	2.9
Low Tide:	9/21/2007	8:42	EDT	1
High Tide:	9/21/2007	16:14	EDT	3.7
Low Tide:	9/21/2007	21:56	EDT	0.9
High Tide:	9/22/2007	4:45	EDT	3.2
Low Tide:	9/22/2007	9:59	EDT	0.8
High Tide:	9/22/2007	17:09	EDT	3.9
Low Tide:	9/22/2007	23:00	EDT	0.6
High Tide:	9/23/2007	5:37	EDT	3.7
Low Tide:	9/23/2007	11:09	EDT	0.4
High Tide:	9/23/2007	17:59	EDT	4.2
Low Tide:	9/23/2007	23:51	EDT	0.2
High Tide:	9/24/2007	6:25	EDT	4.2
Low Tide:	9/24/2007	12:08	EDT	0.1
High Tide:	9/24/2007	18:47	EDT	4.5
Low Tide:	9/25/2007	0:37	EDT	-0.1
High Tide:	9/25/2007	7:11	EDT	4.6
Low Tide:	9/25/2007	13:00	EDT	-0.3
High Tide:	9/25/2007	19:33	EDT	4.7
Low Tide:	9/26/2007	1:20	EDT	-0.5
High Tide:	9/26/2007	7:56	EDT	5
Low Tide:	9/26/2007	13:49	EDT	-0.6
High Tide:	9/26/2007	20:18	EDT	4.8
Low Tide:	9/27/2007	2:03	EDT	-0.7
High Tide:	9/27/2007	8:42	EDT	5.3
Low Tide:	9/27/2007	14:37	EDT	-0.7
High Tide:	9/27/2007	21:05	EDT	4.8
Low Tide:	9/28/2007	2:47	EDT	-0.8
High Tide:	9/28/2007	9:29	EDT	5.4
Low Tide:	9/28/2007	15:26	EDT	-0.7
High Tide:	9/28/2007	21:52	EDT	4.6
Low Tide:	9/29/2007	3:31	EDT	-0.7
High Tide:	9/29/2007	10:18	EDT	5.3
Low Tide:	9/29/2007	16:15	EDT	-0.5
High Tide:	9/29/2007	22:42	EDT	4.3
Low Tide:	9/30/2007	4:17	EDT	-0.5
High Tide:	9/30/2007	11:10	EDT	5.1

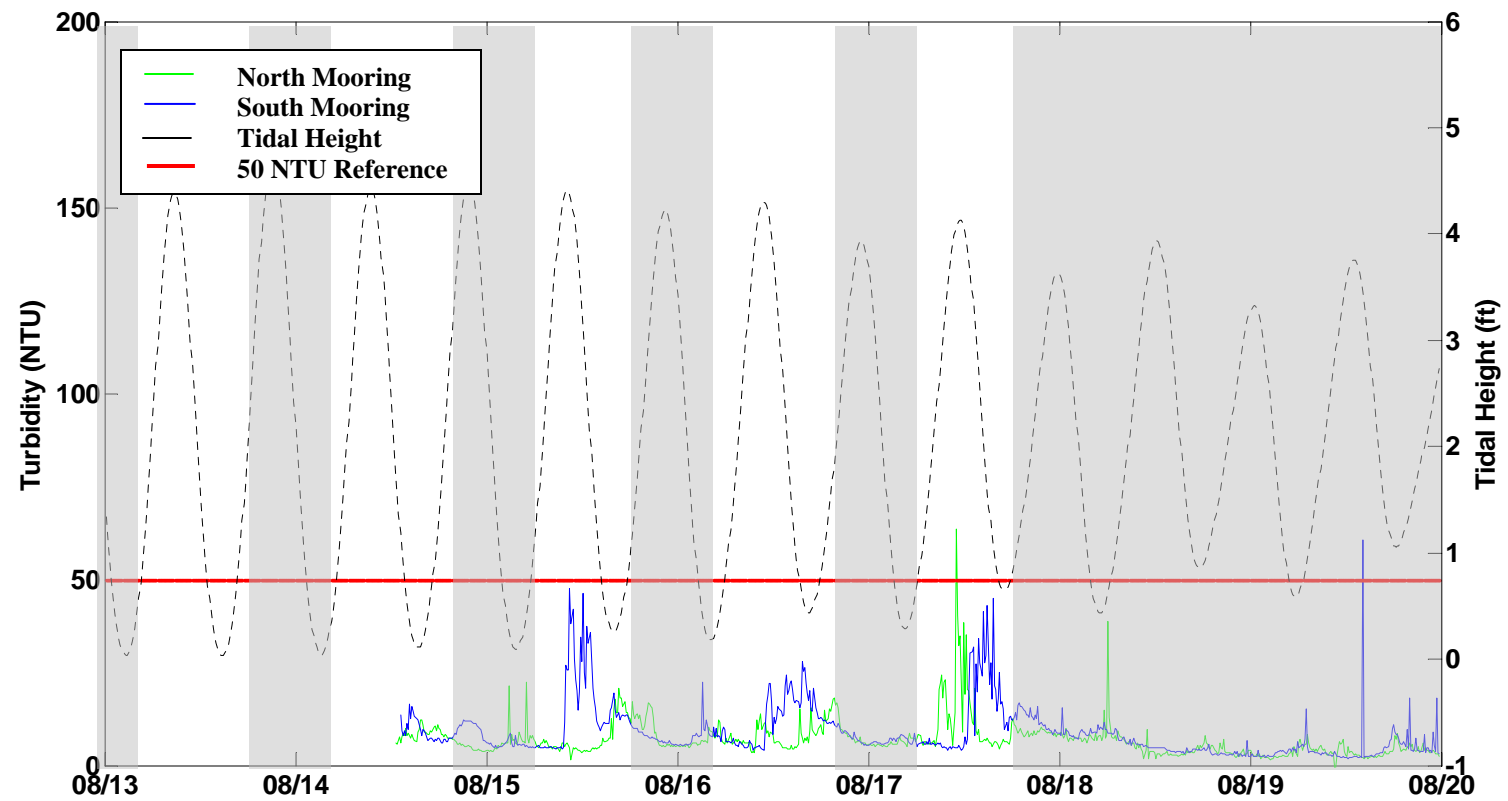
Belleville, Acushnet River, Buzzards Bay, Massachusetts
Newport, Rhode Island + Corrections: High(+0:07 *1.08) Low(+0:09 *1.08)
Units are feet
Mark level: 0.00

Tidal Stage	Date	Time	Time Zone	Tidal Height
Low Tide:	9/30/2007	17:08	EDT	-0.2
High Tide:	9/30/2007	23:35	EDT	4
Low Tide:	10/1/2007	5:06	EDT	-0.2
High Tide:	10/1/2007	12:06	EDT	4.8
Low Tide:	10/1/2007	18:06	EDT	0.2
High Tide:	10/2/2007	0:34	EDT	3.6
Low Tide:	10/2/2007	6:01	EDT	0.2
High Tide:	10/2/2007	13:08	EDT	4.5
Low Tide:	10/2/2007	19:16	EDT	0.5
High Tide:	10/3/2007	1:39	EDT	3.4
Low Tide:	10/3/2007	7:07	EDT	0.5
High Tide:	10/3/2007	14:14	EDT	4.2
Low Tide:	10/3/2007	20:47	EDT	0.7
High Tide:	10/4/2007	2:48	EDT	3.3
Low Tide:	10/4/2007	8:36	EDT	0.7
High Tide:	10/4/2007	15:21	EDT	4
Low Tide:	10/4/2007	22:18	EDT	0.7
High Tide:	10/5/2007	3:54	EDT	3.4
Low Tide:	10/5/2007	10:19	EDT	0.7
High Tide:	10/5/2007	16:24	EDT	4
Low Tide:	10/5/2007	23:21	EDT	0.6
High Tide:	10/6/2007	4:53	EDT	3.6
Low Tide:	10/6/2007	11:31	EDT	0.5
High Tide:	10/6/2007	17:20	EDT	4
Low Tide:	10/7/2007	0:07	EDT	0.5
High Tide:	10/7/2007	5:45	EDT	3.9
Low Tide:	10/7/2007	12:22	EDT	0.4
High Tide:	10/7/2007	18:09	EDT	4.1
Low Tide:	10/8/2007	0:42	EDT	0.3
High Tide:	10/8/2007	6:30	EDT	4.2
Low Tide:	10/8/2007	13:03	EDT	0.2
High Tide:	10/8/2007	18:52	EDT	4.1
Low Tide:	10/9/2007	1:10	EDT	0.2
High Tide:	10/9/2007	7:12	EDT	4.4
Low Tide:	10/9/2007	13:35	EDT	0.1
High Tide:	10/9/2007	19:32	EDT	4.1

Appendix B

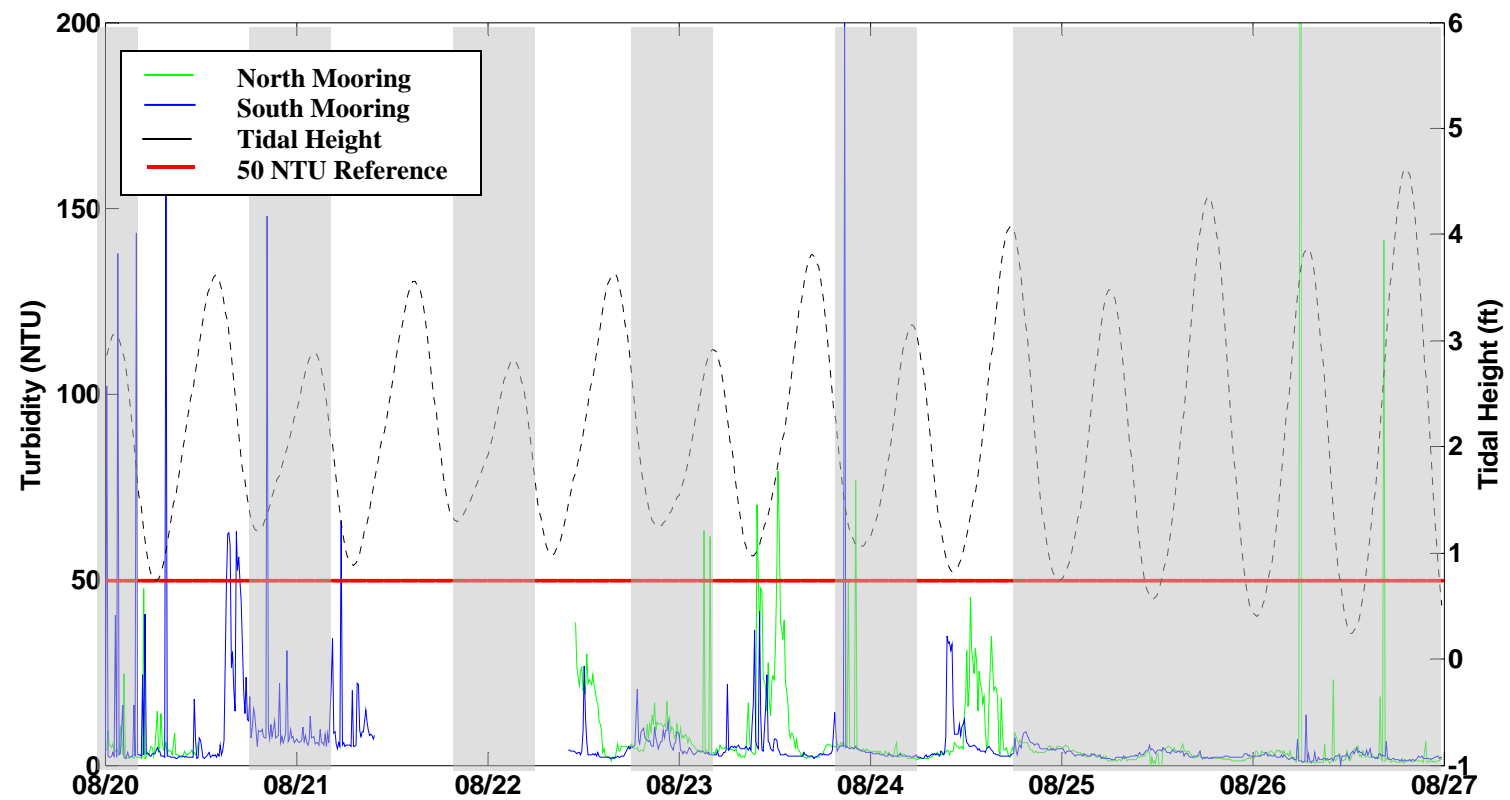
Continuous *In Situ* Water Quality Data

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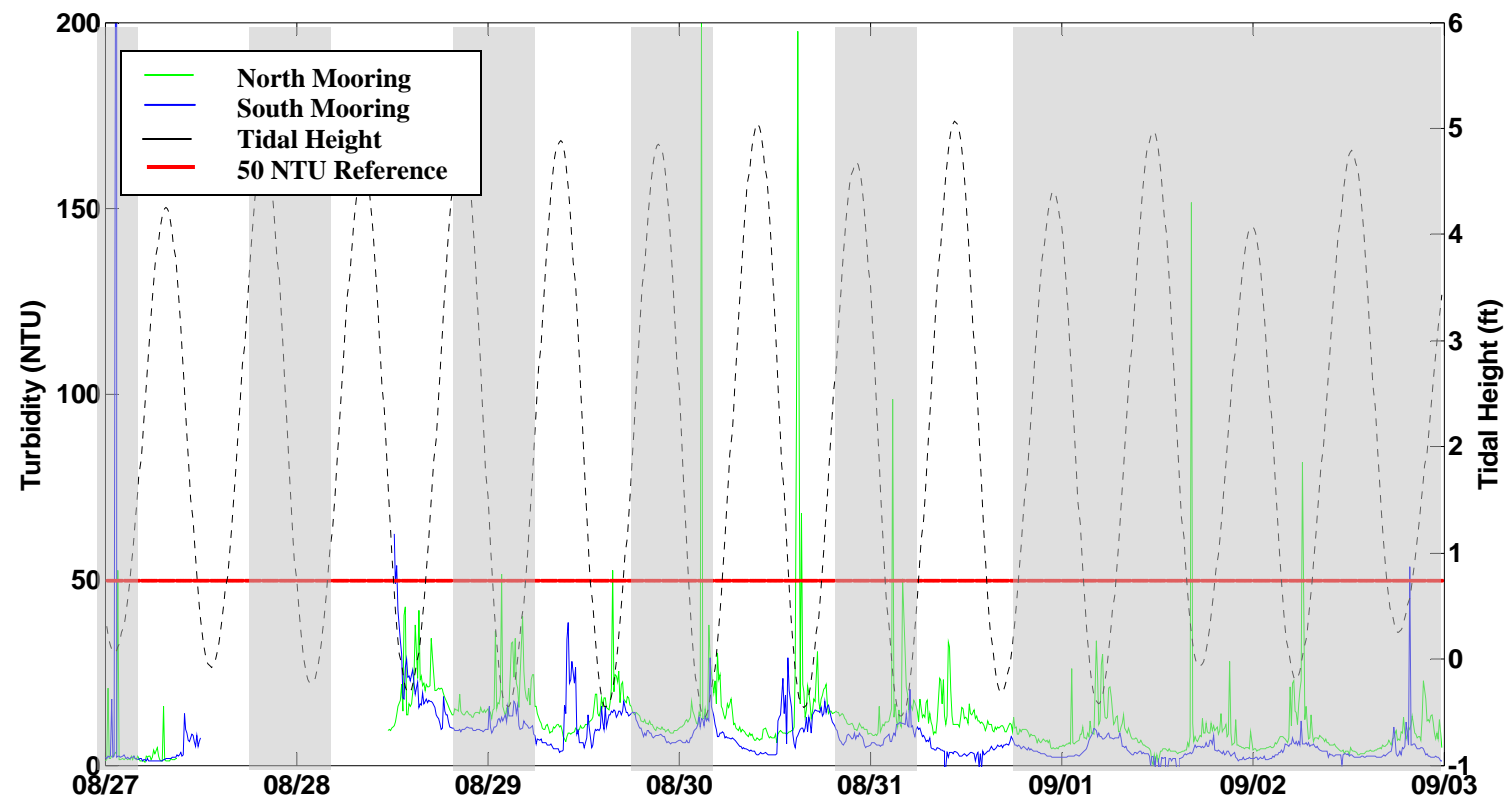
*Shaded areas represent nights and weekends.

Figure B-1. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/13/2007 to 8/20/2007.



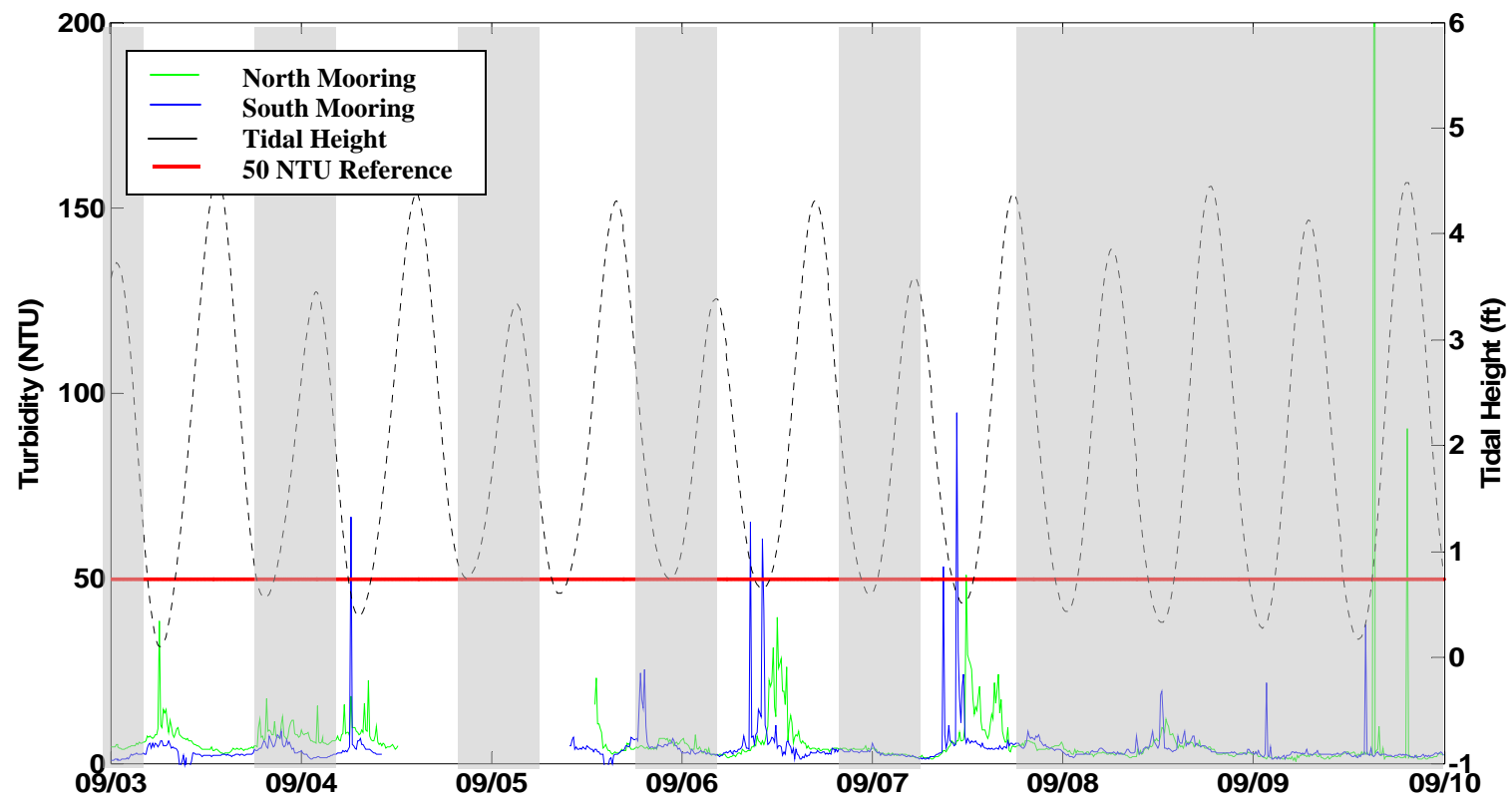
*Shaded areas represent nights and weekends.

Figure B-2. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/20/2007 to 8/27/2007.



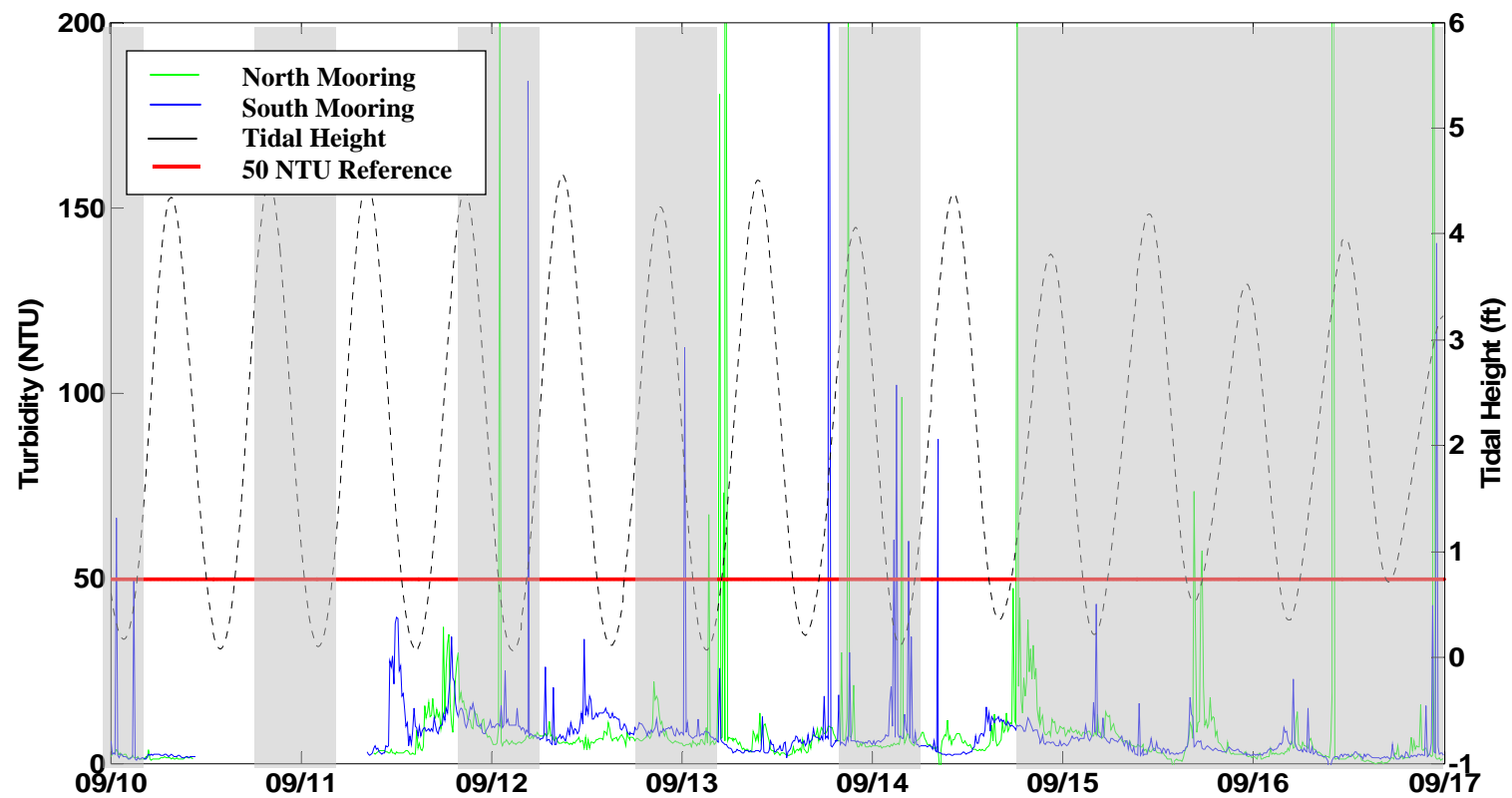
*Shaded areas represent nights and weekends.

Figure B-3. Turbidity Monitoring at New Bedford Harbor Superfund Site 8/27/2007 to 9/3/2007.



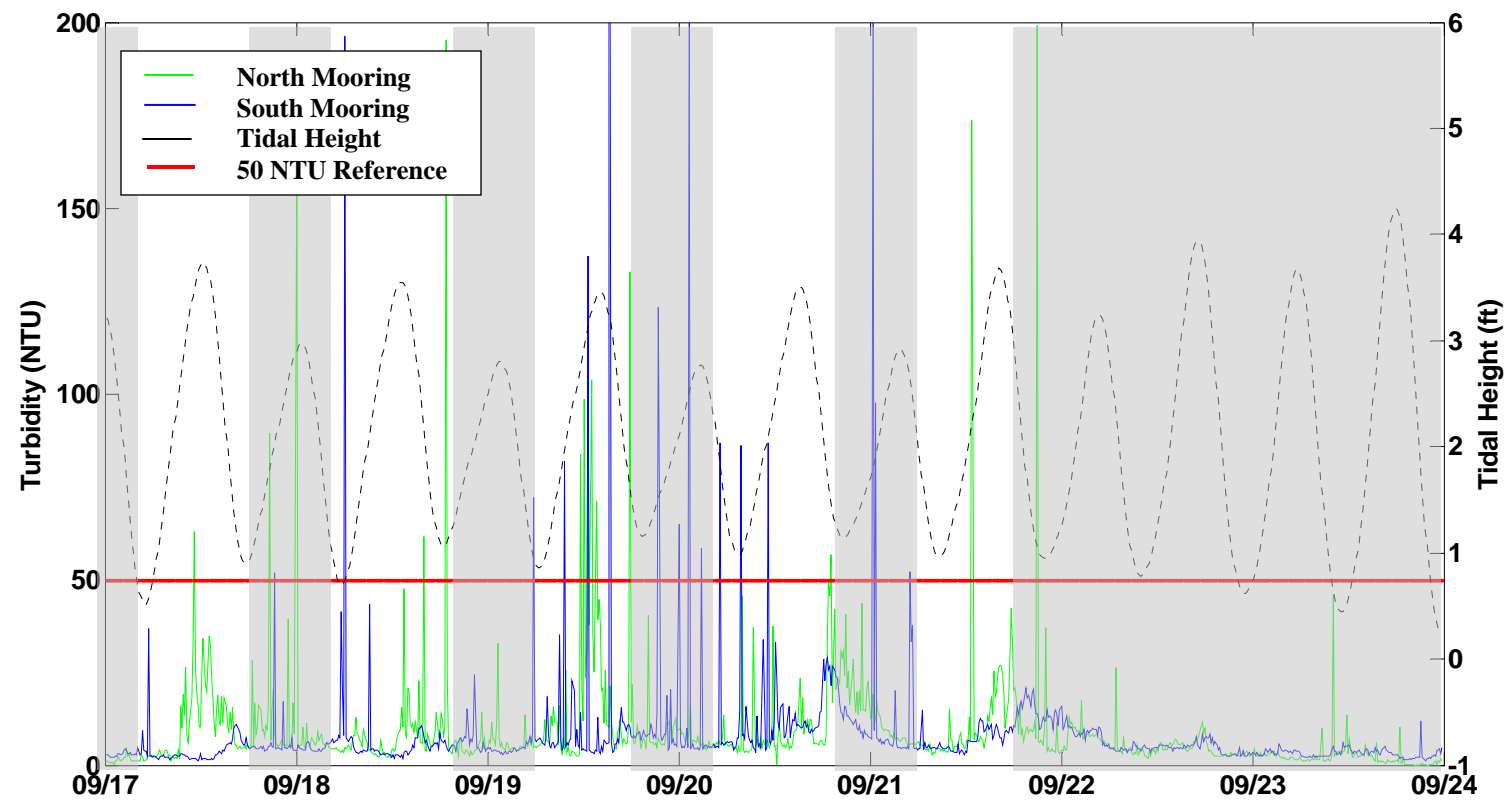
*Shaded areas represent nights and weekends.

Figure B-4. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/3/2007 to 9/10/2007.



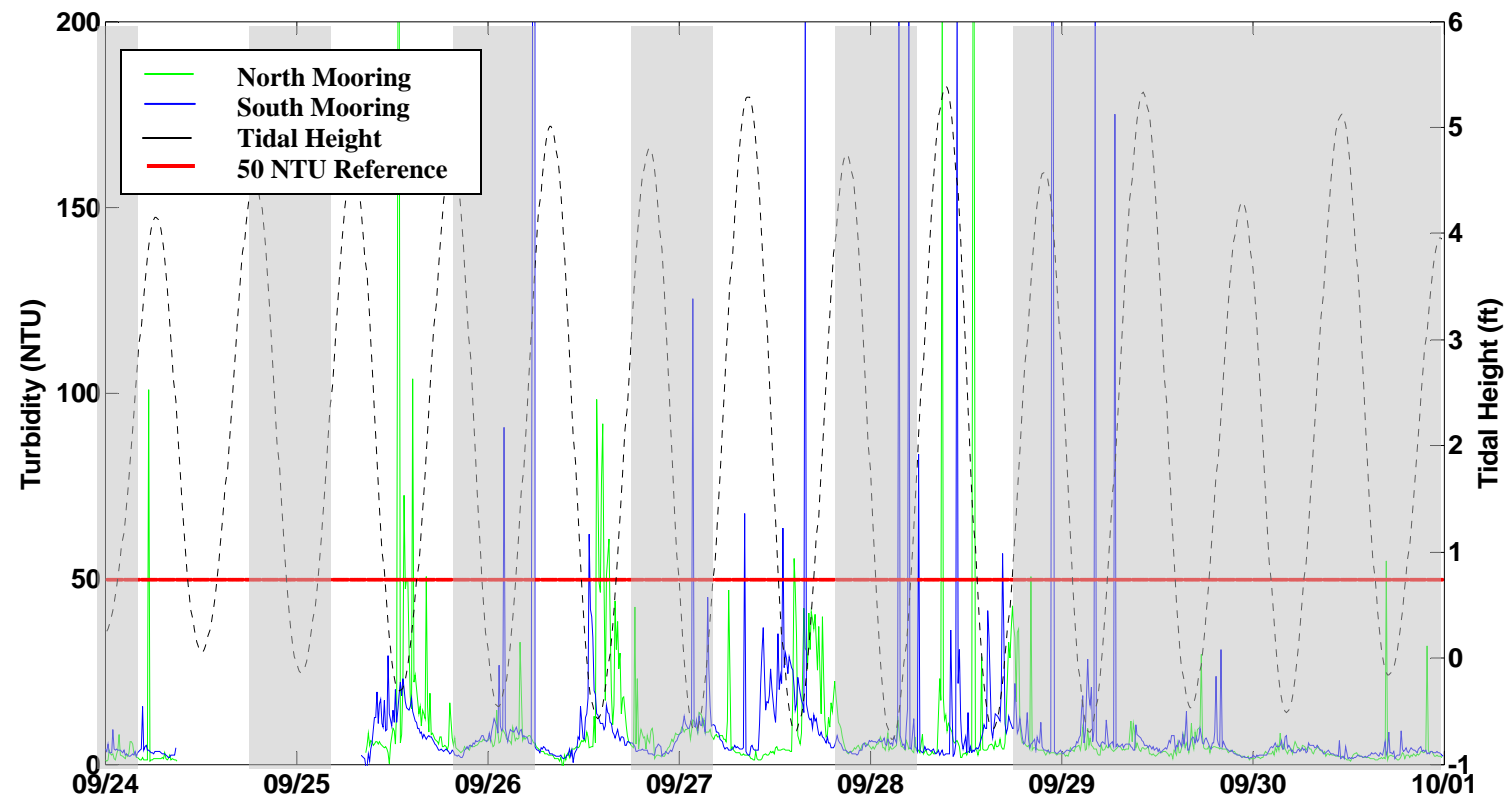
*Shaded areas represent nights and weekends.

Figure B-5. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/10/2007 to 9/17/2007.



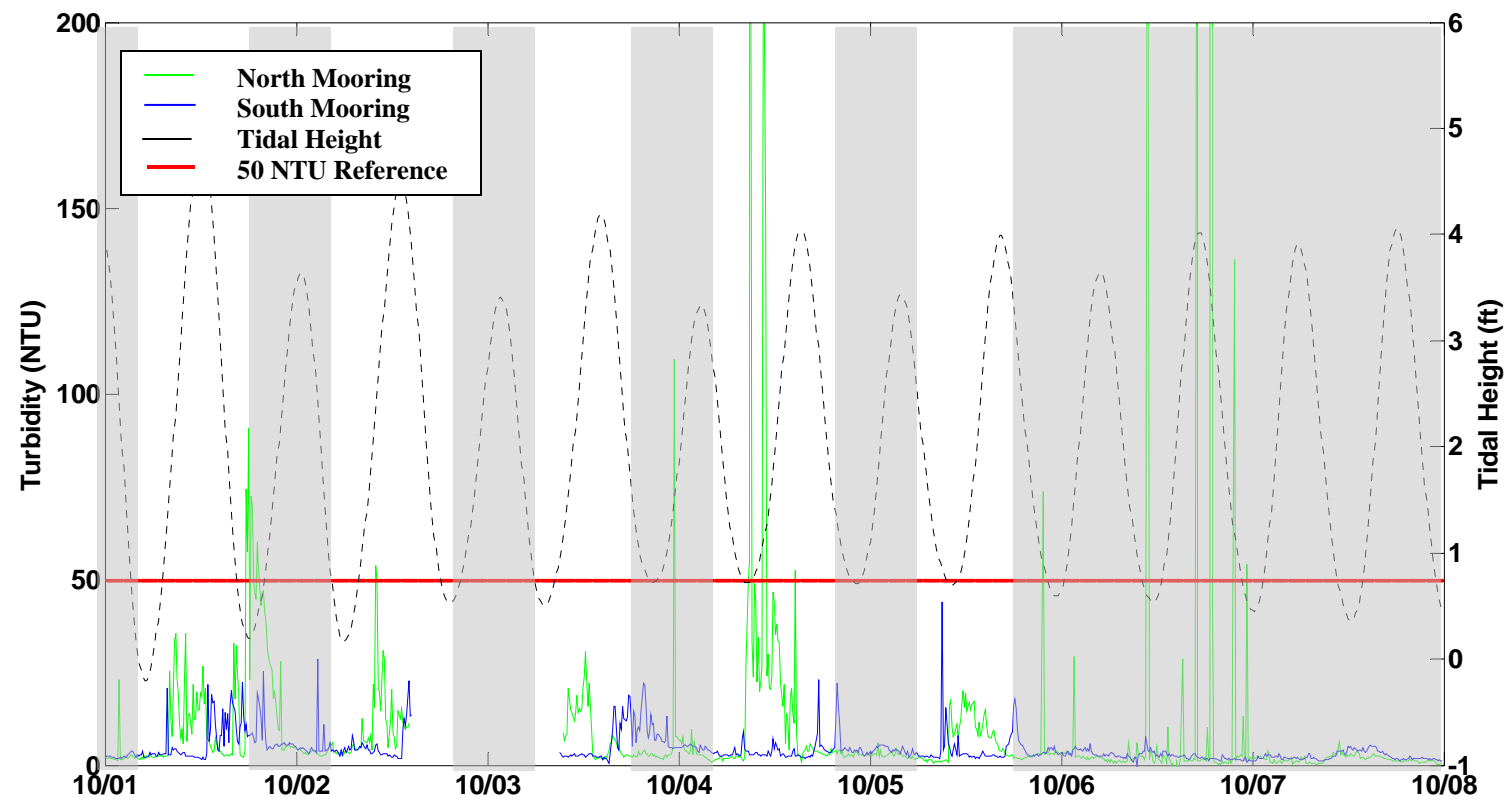
*Shaded areas represent nights and weekends.

Figure B-6. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/17/2007 to 9/24/2007.



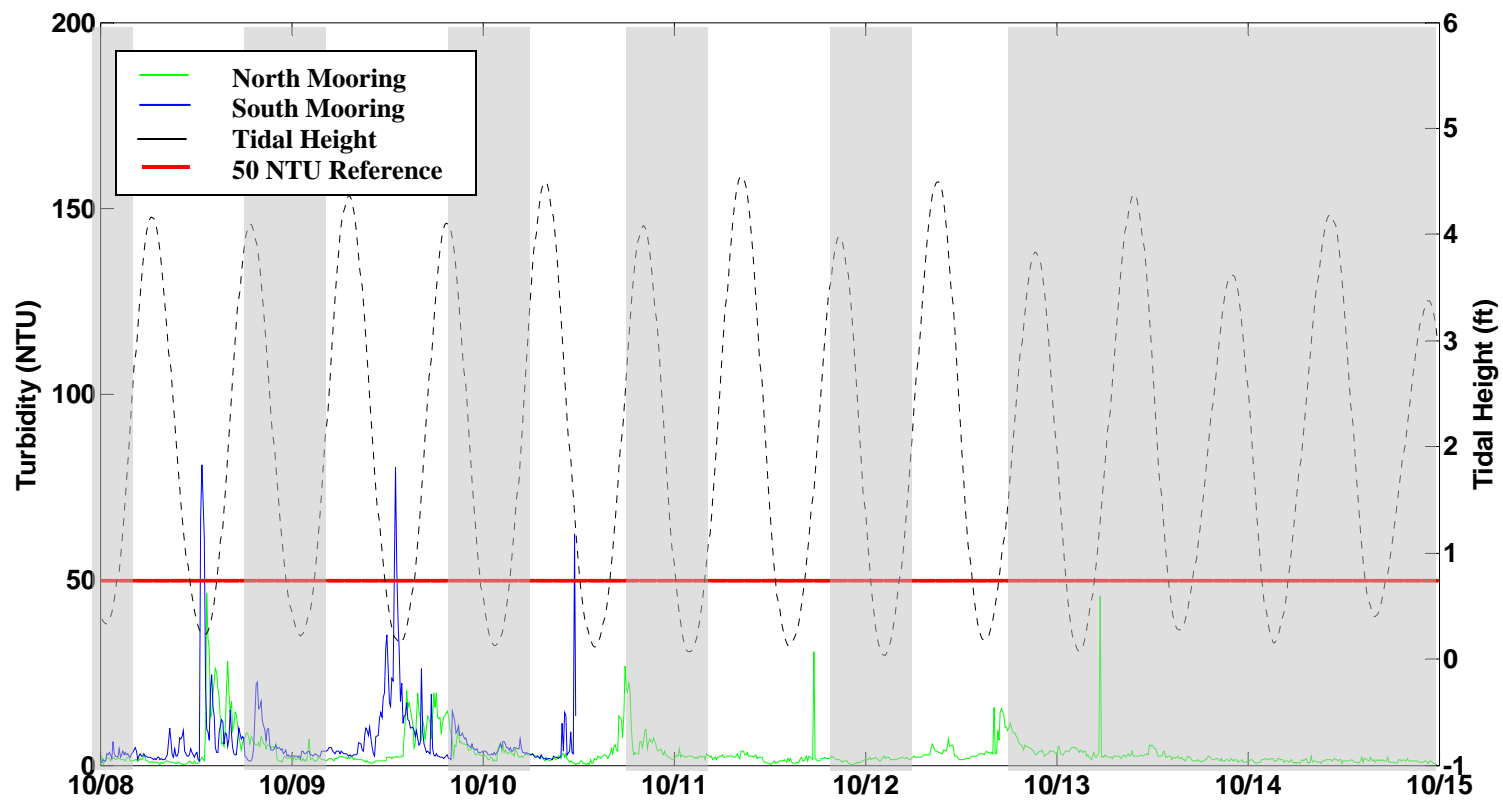
*Shaded areas represent nights and weekends.

Figure B-7. Turbidity Monitoring at New Bedford Harbor Superfund Site 9/24/2007 to 10/1/2007.



*Shaded areas represent nights and weekends.

Figure B-8. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/1/2007 to 10/8/2007.



*Shaded areas represent nights and weekends.

Figure B-9. Turbidity Monitoring at New Bedford Harbor Superfund Site 10/8/2007 to 10/15/2007.

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Appendix C

Total and Dissolved PCB Analytical Data

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APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	MIDREF080907			MIDREF080907				13NTU080907			13NTU080907			
Collected	Collected	8/9/2007			8/9/2007				8/9/2007			8/9/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-001-080907			WQ-DPC-001-080907				WQ-TPC-002-080907			WQ-DPC-002-080907			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.0200	UG/L	D	0.0160	UG/L	D		0.0160	UG/L	D	0.0200	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	0.0250	UG/L	D	0.0180	UG/L	D		0.0230	UG/L	D	0.0220	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.0220	UG/L	D	0.0100	UG/L	D		0.0270	UG/L	D	0.0130	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.0080	UG/L	D	0.0730	UG/L			0.0150	UG/L	D	0.0035	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.0230	UG/L	D	0.0078	UG/L	D		0.0270	UG/L	D	0.0079	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0500	UG/L		0.0140	UG/L			0.0049	UG/L	D	0.0170	UG/L		
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0034	UG/L	D	0.0150	UG/L			0.0099	UG/L	D	0.0200	UG/L		
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0046	UG/L		0.0005	UG/L	U		0.0210	UG/L		0.0005	UG/L	U	
2,3',4,4',5'-Pentacb (PCB 118)	31508-00-6	0.0480	UG/L		0.0058	UG/L			0.0044	UG/L	D	0.0074	UG/L		
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0027	UG/L		0.0005	UG/L	U		0.0180	UG/L	p	0.0005	UG/L	U	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0360	UG/L		0.0017	UG/L			0.0025	UG/L	D	0.0020	UG/L	p	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0540	UG/L		0.0041	UG/L			0.0055	UG/L	D	0.0046	UG/L		
2,2',3,3',4,4',5'-Heptacb (PCB 170)	35065-30-6	0.0035	UG/L		0.0005	UG/L	U		0.0240	UG/L	p	0.0005	UG/L	U	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0052	UG/L		0.0005	UG/L	U		0.0320	UG/L	p	0.0005	UG/L	U	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0064	UG/L		0.0005	UG/L	U		0.0390	UG/L	p	0.0005	UG/L	U	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0005	UG/L	U	0.0005	UG/L	U		0.0026	UG/L	p	0.0005	UG/L	U	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0005	UG/L	U	0.0005	UG/L	U		0.0034	UG/L	p	0.0005	UG/L	U	
DecaCB (PCB 209)	2051-24-3	0.0005	UG/L	U	0.0005	UG/L	U		0.0005	UG/L	U	0.0005	UG/L	U	
Sum of 18 NOAA Congeners (SUM 18 CONG)		0.31	UG/L		0.17	UG/L			0.28	UG/L		0.12	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	20NTU080907			20NTU080907				55NTU080907			55NTU080907			
Collected	Collected	8/9/2007			8/9/2007				8/9/2007			8/9/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-003-080907			WQ-DPC-003-080907				WQ-TPC-004-080907			WQ-DPC-004-080907			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.0160	UG/L	D	0.0220	UG/L	D		0.0180	UG/L	D	0.0300	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	0.0240	UG/L	D	0.0230	UG/L	D		0.0260	UG/L	D	0.0300	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.0250	UG/L	D	0.0140	UG/L	D		0.0310	UG/L	D	0.0170	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.0130	UG/L	D	0.0038	UG/L	D		0.0160	UG/L	D	0.0050	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.0250	UG/L	D	0.0087	UG/L	D		0.0280	UG/L	D	0.0096	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0044	UG/L	D	0.0180	UG/L			0.0053	UG/L	D	0.0210	UG/L		
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0097	UG/L	D	0.0270	UG/L			0.0140	UG/L	D	0.0310	UG/L		
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0180	UG/L		0.0005	UG/L	U		0.0460	UG/L	p	0.0005	UG/L	U	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0044	UG/L	D	0.0099	UG/L			0.0064	UG/L	D	0.0120	UG/L		
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0170	UG/L	p	0.0005	UG/L	U		0.0440	UG/L	p	0.0005	UG/L	U	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0019	UG/L	D	0.0035	UG/L			0.0034	UG/L	D	0.0050	UG/L		
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0052	UG/L	D	0.0068	UG/L			0.0072	UG/L	D	0.0100	UG/L		
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0230	UG/L	p	0.0005	UG/L	U		0.0590	UG/L	p	0.0005	UG/L	U	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0310	UG/L	p	0.0005	UG/L	U		0.0005	UG/L	DUH	0.0005	UG/L	U	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0330	UG/L	p	0.0005	UG/L	U		0.0005	UG/L	DUH	0.0005	UG/L	U	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0022	UG/L	p	0.0005	UG/L	U		0.0076	UG/L	p	0.0005	UG/L	U	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0027	UG/L	p	0.0005	UG/L	U		0.0086	UG/L	p	0.0005	UG/L	U	
DecaCB (PCB 209)	2051-24-3	0.0005	UG/L	U	0.0005	UG/L	U		0.0008	UG/L	p	0.0005	UG/L	U	
Sum of 18 NOAA Congeners (SUM 18 CONG)		0.25	UG/L		0.14	UG/L			0.32	UG/L		0.17	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	WOODR091107			WOODR091107				WOODR091107			WOODR091107			
Collected	Collected	9/11/2007			9/11/2007				9/11/2007			9/11/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				REP			REP			
Sample ID	Sample ID	WQ-TPC-001-091107			WQ-DPC-001-091107				WQ-TPC-001-091107-DUP			WQ-DPC-001-091107-DUP			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.3410	UG/L	D	0.2560	UG/L	D		0.2720	UG/L	D	0.2180	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	0.5150	UG/L	D	0.3370	UG/L	D		0.4060	UG/L	D	0.2940	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.3550	UG/L	D	0.1890	UG/L	D		0.2810	UG/L	D	0.1520	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1270	UG/L	D	0.0480	UG/L			0.0930	UG/L	D	0.0510	UG/L		
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.4380	UG/L	D	0.1830	UG/L	D		0.3400	UG/L	D	0.1600	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0270	UG/L		0.0072	UG/L			0.0210	UG/L		0.0074	UG/L		
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0560	UG/L		0.0140	UG/L			0.0440	UG/L		0.0150	UG/L		
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0020	UG/L		0.0005	UG/L	U		0.0012	UG/L		0.0005	UG/L	U	
2,3',4,4',5-Pentacb (PCB 118)	31508-00-6	0.0330	UG/L		0.0072	UG/L			0.0260	UG/L		0.0071	UG/L		
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0017	UG/L		0.0005	UG/L	U		0.0008	UG/L		0.0005	UG/L	U	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0270	UG/L		0.0039	UG/L			0.0210	UG/L		0.0038	UG/L		
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0410	UG/L		0.0081	UG/L			0.0310	UG/L		0.0067	UG/L		
2,2',3,3',4,4',5-Heptacb (PCB 170)	35065-30-6	0.0016	UG/L		0.0005	UG/L	U		0.0009	UG/L		0.0005	UG/L	U	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0036	UG/L		0.0005	UG/L	U		0.0022	UG/L		0.0005	UG/L	U	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0053	UG/L		0.0005	UG/L	U		0.0037	UG/L		0.0005	UG/L	U	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0005	UG/L	U	0.0005	UG/L	U		0.0005	UG/L	U	0.0005	UG/L	U	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0005	UG/L	U	0.0005	UG/L	U		0.0005	UG/L	U	0.0005	UG/L	U	
DecaCB (PCB 209)	2051-24-3	0.0005	UG/L	U	0.0005	UG/L	U		0.0005	UG/L	U	0.0005	UG/L	U	
Sum of 18 NOAA Congeners (SUM 18 CONG)		2	UG/L		1.1	UG/L			1.5	UG/L		0.91	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	23NTU091107			23NTU091107				60NTU091107			60NTU091107			
Collected	Collected	9/11/2007			9/11/2007				9/11/2007			9/11/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-002-091107			WQ-DPC-002-091107				WQ-TPC-003-091107			WQ-DPC-003-091107			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.7210	UG/L	D	0.4350	UG/L	D		2.3070	UG/L	D	0.5420	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	1.2140	UG/L	D	0.5020	UG/L	D		4.8040	UG/L	D	0.5540	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.8800	UG/L	D	0.2020	UG/L	D		3.8780	UG/L	D	0.2470	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.4310	UG/L	D	0.0640	UG/L			1.8580	UG/L	D	0.0730	UG/L		
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	1.8200	UG/L	D	0.2570	UG/L	D		7.9340	UG/L	D	0.2860	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0110	UG/L	D	0.0064	UG/L			0.2770	UG/L	D	0.0050	UG/L		
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.2290	UG/L	D	0.0150	UG/L			0.8310	UG/L	D	0.0140	UG/L		
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0140	UG/L		0.0005	UG/L	U		0.0430	UG/L	p	0.0005	UG/L	U	
2,3',4,4',5'-Pentacb (PCB 118)	31508-00-6	0.0980	UG/L	D	0.0057	UG/L			0.3360	UG/L	D	0.0053	UG/L		
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0150	UG/L		0.0005	UG/L	U		0.0440	UG/L	p	0.0005	UG/L	U	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0870	UG/L	D	0.0037	UG/L			0.4040	UG/L	D	0.0033	UG/L		
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.2160	UG/L	D	0.0077	UG/L			1.0110	UG/L	D	0.0071	UG/L		
2,2',3,3',4,4',5'-Heptacb (PCB 170)	35065-30-6	0.0240	UG/L	p	0.0005	UG/L	U		0.0430	UG/L	D	0.0005	UG/L	U	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0330	UG/L	p	0.0005	UG/L	U		0.1010	UG/L	D	0.0005	UG/L	U	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0460	UG/L	p	0.0005	UG/L	U		0.2710	UG/L	D	0.0005	UG/L	U	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0047	UG/L	p	0.0005	UG/L	U		0.0170	UG/L	p	0.0005	UG/L	U	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0063	UG/L	p	0.0005	UG/L	U		0.0190	UG/L	p	0.0005	UG/L	U	
DecaCB (PCB 209)	2051-24-3	0.0016	UG/L	p	0.0005	UG/L	U		0.0050	UG/L	p	0.0005	UG/L	U	
Sum of 18 NOAA Congeners (SUM 18 CONG)		5.9	UG/L		1.5	UG/L			24	UG/L		1.7	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	50N100307			50N100307				300N100307			300N100307			
Collected	Collected	10/3/2007			10/3/2007				10/3/2007			10/3/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	SA			SA				SA			SA			
Sample ID	Sample ID	WQ-TPC-001-100307			WQ-DPC-001-100307				WQ-TPC-002-100307			WQ-DPC-002-100307			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.6590	UG/L	D	0.2800	UG/L	D		0.2530	UG/L	D	0.2550	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	1.3910	UG/L	D	0.3720	UG/L	D		0.4610	UG/L	D	0.4100	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	1.4920	UG/L	D	0.1850	UG/L	D		0.3660	UG/L	D	0.3110	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.6520	UG/L	D	0.0420	UG/L	D		0.0920	UG/L	D	0.1220	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	1.9500	UG/L	D	0.1670	UG/L	D		0.4550	UG/L	D	0.3440	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.2340	UG/L	D	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0250	UG/L	D	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.6680	UG/L	D	0.0052	UG/L	DU		0.0650	UG/L	D	0.0840	UG/L	D	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,3',4,4',5'-Pentacb (PCB 118)	31508-00-6	0.4530	UG/L	D	0.0053	UG/L	DU		0.0250	UG/L	Dp	0.0490	UG/L	D	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.2280	UG/L	D	0.0053	UG/L	DU		0.0250	UG/L	DU	0.0230	UG/L	Dp	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.4950	UG/L	D	0.0052	UG/L	DU		0.0240	UG/L	DpJ	0.0560	UG/L	D	
2,2',3,3',4,4',5'-Heptacb (PCB 170)	35065-30-6	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0250	UG/L	DU	0.0052	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		8.2	UG/L		1	UG/L			1.7	UG/L		1.7	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	300N100307			300N100307				600N100307			600N100307			
Collected	Collected	10/3/2007			10/3/2007				10/3/2007			10/3/2007			
Fraction	Fraction	TOTAL			DISS				TOTAL			DISS			
QC Code	QC Code	REP			REP				SA			SA			
Sample ID	Sample ID	WQ-TPC-002-100307-DUP			WQ-DPC-002-100307-DUP				WQ-TPC-003-100307			WQ-DPC-003-100307			
Param Name	Param Code	Result	Unit	Final Q	Result	Unit	Final Q		Result	Unit	Final Q	Result	Unit	Final Q	
2,4'-Dicb (PCB 8)	34883-43-7	0.2440	UG/L	D	0.1730	UG/L	D		0.2440	UG/L	D	0.1750	UG/L	D	
2,2',5'-Tricb (PCB 18)	37680-65-2	0.4860	UG/L	D	0.2550	UG/L	D		0.4720	UG/L	D	0.2390	UG/L	D	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.4360	UG/L	D	0.1560	UG/L	D		0.3860	UG/L	D	0.1320	UG/L	D	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.1110	UG/L	D	0.0360	UG/L	D		0.0960	UG/L	D	0.0260	UG/L	D	
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.5040	UG/L	D	0.1300	UG/L	D		0.4430	UG/L	D	0.1110	UG/L	D	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0250	UG/L	DU	0.0050	UG/L	UJ		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0250	UG/L	UJ	0.0050	UG/L	DU		0.0620	UG/L	D	0.0049	UG/L	DU	
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,3',4,4',5'-Pentacb (PCB 118)	31508-00-6	0.0370	UG/L	Dp	0.0051	UG/L	DU		0.0200	UG/L	DpJ	0.0050	UG/L	DU	
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0250	UG/L	DU	0.0051	UG/L	UJ		0.0240	UG/L	DU	0.0050	UG/L	DU	
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0530	UG/L	Dp	0.0050	UG/L	DU		0.0270	UG/L	Dp	0.0049	UG/L	DU	
2,2',3,3',4,4',5'-Heptacb (PCB 170)	35065-30-6	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,4',5,5',6-Heptacb (PCB 187)	52663-68-0	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,3',4,4',5,6-Octacb (PCB 195)	52663-78-2	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	40186-72-9	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
DecaCB (PCB 209)	2051-24-3	0.0250	UG/L	DU	0.0050	UG/L	DU		0.0240	UG/L	DU	0.0049	UG/L	DU	
Sum of 18 NOAA Congeners (SUM 18 CONG)		1.9	UG/L		0.75	UG/L			1.8	UG/L		0.68	UG/L		

APPENDIX C

Individual Congener and Sum of Congeners Results

Station ID	Station ID	EB091107		
Collected	Collected	9/11/2007		
Fraction	Fraction	TOTAL		
QC Code	QC Code	SA		
Sample ID	Sample ID	WQ-TPC-004-091107-EB		
Param Name	Param Code	Result	Unit	Final Q
2,4'-Dicb (PCB 8)	34883-43-7	0.0039	UG/L	
2,2',5'-Tricb (PCB 18)	37680-65-2	0.0056	UG/L	
2,4,4'-Tricb (PCB 28)	7012-37-5	0.0015	UG/L	
2,2',3,5'-Tetracb (PCB 44)	41464-39-5	0.0005	UG/L	U
2,2',5,5'-Tetracb (PCB 52)	35693-99-3	0.0042	UG/L	
2,3',4,4'-Tetracb (PCB 66)	32598-10-0	0.0005	UG/L	U
2,2',4,5,5'-Pentacb (PCB 101)	37680-73-2	0.0005	UG/L	U
2,3,3',4,4'-Pentacb (PCB 105)	32598-14-4	0.0005	UG/L	U
2,3',4,4',5'-Pentacb (PCB 118)	31508-00-6	0.0005	UG/L	U
2,2',3,3',4,4'-Hexacb (PCB 128)	38380-07-3	0.0005	UG/L	U
2,2',3,4,4',5'-Hexacb (PCB 138)	35065-28-2	0.0005	UG/L	U
2,2',4,4',5,5'-Hexacb (PCB 153)	35065-27-1	0.0005	UG/L	U
2,2',3,3',4,4',5'-Heptacb (PCB 170)	35065-30-6	0.0005	UG/L	U
2,2',3,4,4',5,5'-Heptacb (PCB 180)	35065-29-3	0.0005	UG/L	U
2,2',3,4',5,5',6'-Heptacb (PCB 187)	52663-68-0	0.0005	UG/L	U
2,2',3,3',4,4',5,6'-Octacb (PCB 195)	52663-78-2	0.0005	UG/L	U
2,2',3,3',4,4',5,5',6'-Nonacb (PCB 206)	40186-72-9	0.0005	UG/L	U
DecaCB (PCB 209)	2051-24-3	0.0005	UG/L	U
Sum of 18 NOAA Congeners (SUM 18 CONG)		0.015		

APPENDIX C

PCB Data Qualifiers

Qualifiers:

D	Dilution run. Initial run outside linear range of instrument
J	Analyte detected below the sample specific reporting limit
p	The relative percent difference (RPD) between the values obtained from the dual columns is >40%.
U	Analyte not detected at 3:1 signal:noise ratio. Reporting limit is reported.

Appendix D

Toxicity Analytical Data

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**Biomonitoring of Surface Water Samples
New Bedford Harbor
New Bedford, Massachusetts
Fall 2007**

Prepared for

Battelle
397 Washington Street
Duxbury, Massachusetts 02332

Prepared by

EnviroSystems, Incorporated
1 Lafayette Road
Hampton, New Hampshire 03843

August-October 2007
Reference Number: Battele16150,16234,16391

Biomonitoring of Surface Water Samples New Bedford Harbor, New Bedford, Massachusetts

Fall 2007

1.0 INTRODUCTION

This report provides a summarization of data generated from a series of acute and chronic exposure screening assays evaluating surface water samples collected from New Bedford Harbor. Toxicity tests were conducted on grab surface water samples collected from the specified areas in the harbor. Assay design included a laboratory control treatment and one or more surface water samples. Samples were evaluated "As Received" without dilutions. Assays were conducted based on water quality levels in the vicinity of dredging operations. Samples were collected by Battelle personnel from the Duxbury, Massachusetts office. Testing was based on programs and protocols developed by the US EPA (2002) and included the following assays; modified 2 day acute and 7 day chronic assays conducted with the mysid shrimp, *Americamysis bahia*, and the red macro alga, *Champia parvula*, and 60 minute chronic fertilization assays conducted with the purple sea urchin, *Arbacia punctulata*. All mysid and urchin fertilization assays and a portion of the algal assays were conducted by ESI at its Hampton, New Hampshire facility. Additionally, the algal assays were conducted by the Saskatchewan Research Council, SRC, Saskatoon, Saskatchewan, Canada.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program followed procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples.

2.2 Test Species

A. bahia, ≤ 5 days, were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. Juvenile shrimp were collected daily, isolated, and placed in a rearing tank for up to 6 days. Holding tanks were maintained in a flow-through culture mode at a temperature of $25 \pm 2^\circ\text{C}$. At the start of the assays the mysids were 7 days old. Juveniles were fed ≤ 24 hour old brine shrimp on a daily basis. Water temperature, salinity, and pH were monitored on a daily basis. Prior to testing, organisms were siphoned from the rearing tanks to a holding vessel, and then transferred to test chambers using a large bore pipet, minimizing the amount of water added to test solutions.

A. punctulata adults were from cultures maintained by ESI. Original stock was obtained from commercial supply. Male and female urchins are maintained in separate chambers as recommended by protocol (EPA 2002) and ESI. Adult urchins were induced to spawn by the injection of a potassium chloride solution. The viability of gametes obtained was determined prior to their addition to the test solutions. Eggs and/or sperm that would not result in a fertilized egg were rejected from the pool of gametes used in the assay.

C. parvula biomass was obtained from stock cultures maintained by the Saskatchewan Research Council. Original stocks were obtained from the University of Texas algal collection. The male and female plants are maintained in separate culture vessels under sterile conditions. Algal cultures were maintained on an orbital shaker (100 rpm) at $23 \pm 2^\circ\text{C}$ under 16 hour light : 8 hours dark at 40 to 75 foot candles light intensity. Cultures are "cropped" and transferred to fresh nutrient solutions on a weekly basis.

2.3 Surface Water Samples and Laboratory Control Water

Grab surface water samples were collected by Battelle staff on three occasions in the Harbor, Table 1. Samples were placed in polyethylene cubitainers for shipment to the laboratory. Two, 2.5 gallon cubitainers were collected for each of the chronic assays. Prior to testing, samples were evaluated to document salinity, conductivity, and total residual chlorine. Total residual chlorine was measured by amperometric titration (MDL

0.05 mg/L). Prior to use in the assays, the salinity of the samples was adjusted, if necessary, to predetermined levels using artificial sea salts for *A. bahia* and *A. punctulata* assays, and GP-2 salts (EPA 2002) for the *C. parvula* assays. The salinity of samples for the *A. bahia* acute and chronic exposure assays were adjusted to $25 \pm 2\text{‰}$ while samples used for the *A. punctulata* and *C. parvula* assays were adjusted to $30 \pm 2\text{‰}$. Samples with “as received” salinity above these levels were not adjusted.

Laboratory control water used for mysid and sea urchin assays was collected from the Hampton/Seabrook Estuary. This water is classified as SA-1 and has been used to culture marine test organisms since 1981. The laboratory control water used in the algal assay, collected from Rye, New Hampshire, is the same water used in culture maintenance. Prior to use, seawater used in the algal assays was filtered through glass fiber filters and sterilized. Dilution water used in the algal assays conducted by SRC was natural seawater collected from the West Coast of Canada. Salinity of the surface water samples was adjusted using commercial sea salts.

2.4 Bioassays

2.4.1 *Americamysis bahia* Modified Acute and Chronic Exposure Bioassays

Modified acute and chronic exposure screening assays were conducted in a static renewal test mode with renewals made at 24-hour intervals. The 7 day assays were conducted at a temperature of $26 \pm 1^\circ\text{C}$ with a photoperiod of 16:8 hours light:dark. Mysids were maintained in 250 mL beakers containing 150 mL of test solution. Approximately 100 mL of the test solution were replaced each day. The assay incorporated 8 replicates with 5 organisms/replicate. Survival and dissolved oxygen were measured daily in each replicate prior to test solution renewal. Salinity, temperature and pH were recorded in a composite sample of the “old” test solution and in the “new” test solution prior to being added to the test chamber. Incubator temperatures were also recorded on a daily basis.

During the test, mysids were fed ≤ 24 hour old *Artemia* nauplii. On Day 7 of the assay, surviving mysids were removed from test solutions, rinsed to remove any surface detritus and salts, and transferred to tared foils and dried for 24 hours at 103°C . Foils were weighed to the nearest 0.01 mg. Mean dry weights per individual were obtained by dividing the net dry weight of all surviving organisms by the number of organisms added at the start of the assay.

2.4.2 *Arbacia punctulata* Chronic Exposure Fertilization Assays

Gametes were obtained by potassium chloride injection to induce spawning. Sperm were collected dry, diluted to achieve a concentration of approximately 5.0×10^7 sperm/mL in the surface water treatments. Actual sperm concentrations are provided on laboratory bench sheets in Appendix A. Sperm solutions were added to 5 mL aliquots of each sample being evaluated and allowed to remain in the test solutions for 60 minutes before the addition of unfertilized eggs. Each treatment incorporated a total of four (4) replicates. After 20 minutes exposure, the assay was terminated by the addition of 0.2 mL of preservative. Aliquots of preserved solution were counted to determine numbers of fertilized and unfertilized eggs. Fertilization was accepted based on the presence or absence of a fertilization membrane around the egg.

2.4.3 *Champia parvula* Modified Acute and Chronic Exposure Assays

The 7 day red algae assay was conducted with a 2 day exposure period to the surface waters and laboratory control treatments. Each treatment used four replicates with five female branches and one male branch per replicate. Temperature was maintained at $23 \pm 1^\circ\text{C}$. The light source was cool white and fluorescent bulbs set on a 16:8 hours light:dark cycle, with a light intensity of 40 to 75 foot candles. Light intensity was checked at the start of each assay. Temperatures were monitored on a daily basis. Test chambers were 200 mL borosilicate glass fleakers. After 2 days exposure, female branch tips were transferred to approximately 100 mL of recovery medium with added nutrients and allowed to recover and mature for 5 days. During transfer, plants were examined to determine the physical condition of the individual branches. Branches showing signs of degeneration were noted and used to establish an acute endpoint. After the recovery period, the number of cystocarps (reproductive bodies) on each female branch were counted.

2.5 Data Analysis

Statistical analysis of acute and chronic exposure data was completed using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute and chronic exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For chronic exposure endpoints statistical significance was accepted at $\alpha < 0.05$.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results, summarized in Table 7, provide relative health and response data while allowing for comparison with historic data sets.

2.7 Protocol Deviations and Unacceptable Assays

Review of data collected from the three sets of assays conducted during the monitoring period documented no protocol deviations.

3.0 RESULTS SUMMARY

Table 2 provides a summary of test acceptability for the three rounds of assays conducted during this monitoring period. Tables 3-5 provide summaries of survival, growth, development and reproduction endpoints and associated statistical analyses. Table 6 provides a summary of basic water quality data associated with the assays. Support data, including laboratory bench sheets, are provided in Appendix A.

4.0 REFERENCES

- APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th edition. Washington D.C.
- USEPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fourth Edition. EPA-821-R-02-012.
- US EPA. 2002. *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. Fourth Edition. EPA-821-R-02-013.

Table 1. Summary of Sample Collection Data. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Sample ID	Lab Code	Collected		Received		Temperature °C
WQ-TOX-001-080907	16150-001	08/09/07	0840	08/09/07	1455	6
WQ-TOX-002-080907	16150-002	08/09/07	0915	08/09/07	1455	6
WQ-TOX-003-080907	16150-003	08/09/07	0930	08/09/07	1455	6
WQ-TOX-004-080907	16150-004	08/09/07	1005	08/09/07	1455	6
WQ-TOX-001-091107	16234-001	09/11/07	0901	09/11/07	1600	5
WQ-TOX-002-091107	16234-002	09/11/07	0945	09/11/07	1600	5
WQ-TOX-003-091107	16234-003	09/11/07	1015	09/11/07	1600	5
WQ-TOX-001-100307	16391-001	10/03/07	1100	10/03/07	1432	6
WQ-TOX-002-100307	16391-002	10/03/07	1150	10/03/07	1432	6
WQ-TOX-003-100307	16391-003	10/03/07	1228	10/03/07	1432	6

Table 2. Summary of Assay Acceptability. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Lab Code	<i>Americamysis bahia</i>		<i>Champia parvula</i>		<i>Arbacia punctulata</i>
	Acute Exposure	Chronic Exposure	Acute Exposure	Chronic Exposure	Chronic Exposure
16150-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16150-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16150-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16150-004	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16234-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16234-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16234-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16391-001	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16391-002	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
16391-003	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Table 3. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring August 09, 2007 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
<i>Arbacia punctulata</i>		Portion Fertilized							
Lab Control	4	96.9%	95.2%	98.1%	1.45%	-	-	-	-
TOX-001-080907		97.3%	96.2%	98.1%	0.93%	0.6832	NO	-	-
TOX-002-080907		96.7%	95.2%	99.0%	1.69%	0.4592	NO	0.3084	NO
TOX-003-080907		97.8%	97.1%	98.1%	0.49%	0.8642	NO	0.7947	NO
TOX-004-080907		95.0%	90.1%	100.0%	4.67%	0.3293	NO	0.2616	NO
<i>Americamysis bahia</i>		Day 2 Survival							
Lab Control	8	92.5%	60.0%	100.0%	16.09%	-	-	-	-
TOX-001-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	-	-
TOX-002-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	0.4796	NO
TOX-003-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	0.4796	NO
TOX-004-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	0.4796	NO
		Day 7 Survival							
Lab Control	8	92.5%	60.0%	100.0%	16.09%	-	-	-	-
TOX-001-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	-	-
TOX-002-080907		97.5%	80.0%	100.0%	7.25%	0.6395	NO	0.4796	NO
TOX-003-080907		95.0%	80.0%	100.0%	9.75%	0.5204	NO	0.3605	NO
TOX-004-080907		95.0%	80.0%	100.0%	9.75%	0.5204	NO	0.3605	NO
		Day 7 Dry Weight Biomass - mg							
Lab Control	8	0.350	0.138	0.448	30.72%	-	-	-	-
TOX-001-080907		0.473	0.330	0.660	25.53%	0.9753	NO	-	-
TOX-002-080907		0.423	0.314	0.610	20.82%	0.9195	NO	0.1789	NO
TOX-003-080907		0.436	0.274	0.536	18.13%	0.9550	NO	0.2403	NO
TOX-004-080907		0.372	0.328	0.402	7.19%	0.6998	NO	0.0267	YES
<i>Champia parvula</i>		Day 2 Survival							
Lab Control	4	100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-080907		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-080907		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-080907		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-004-080907		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
		Day 7 Mean # Cystocarps							
Lab Control	4	38.55	29.6	43.2	16.18%	-	-	-	-
TOX-001-080907		34.15	26.6	42.8	24.46%	0.2155	NO	-	-
TOX-002-080907		19.5	13.6	24.4	24.29%	0.0014	YES	0.0112	YES
TOX-003-080907		40.35	33.8	46.6	16.32%	0.6474	NO	0.8561	NO
TOX-004-080907		24.35	10.4	36.2	43.79%	0.0306	YES	0.0990	NO

Table 4. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring September 11, 2007 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
<i>Arbacia punctulata</i>									
		Portion Fertilized							
Lab Control	4	86.3%	78.0%	92.0%	7.19%	-	-	-	-
TOX-001-091107		92.7%	90.0%	97.2%	2.08%	0.9592	NO	-	-
TOX-002-091107		94.1%	91.7%	96.2%	2.46%	0.9789	NO	0.8224	NO
TOX-003-091107		84.8%	79.2%	90.0%	6.23%	0.3130	NO	0.0098	YES
<i>Americamysis bahia</i>									
		Day 2 Survival							
Lab Control	8	100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
		Day 7 Survival							
Lab Control	8	100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-091107		98.8%	90.0%	100.0%	3.58%	0.3605	NO	-	-
TOX-002-091107		98.8%	90.0%	100.0%	3.58%	0.3605	NO	0.4796	NO
TOX-003-091107		45.0%	30.0%	70.0%	35.63%	0.0001	YES	0.0001	YES
		Day 7 Dry Weight Biomass - mg							
Lab Control	8	0.278	0.249	0.293	5.33%	-	-	-	-
TOX-001-091107		0.322	0.291	0.356	6.35%	0.9999	NO	-	-
TOX-002-091107		0.283	0.241	0.312	9.04%	0.6718	NO	0.0021	YES
TOX-003-091107		0.090	0.040	0.150	37.10%	0.0000	YES	0.0000	YES
<i>Champia parvula</i>									
		Day 2 Survival							
Lab Control	4	100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-001-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-003-091107		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
		Day 7 Mean # Cystocarps							
Lab Control	4	19.00	15.0	22.6	17.45%	-	-	-	-
TOX-001-091107		20.80	17.4	24.4	13.80%	0.7785	NO	-	-
TOX-002-091107		27.35	23.6	29.4	9.39%	0.9964	NO	0.9928	NO
TOX-003-091107		5.45	1.6	8.2	51.58%	0.0004	YES	0.0001	YES

Table 5. Endpoint Summary Table - New Bedford Harbor Water Quality Monitoring October 13, 2007 Sampling Event. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Sample ID	Reps	Mean	Min	Max	CV	Significant Difference vs			
						p Value	Lab	p Value	Ref
<i>Arbacia punctulata</i>									
		Portion Fertilized							
Lab Control	4	93.2%	88.5%	100.0%	5.53%	-	-	-	-
TOX-003-100307		95.5%	92.6%	98.0%	2.35%	0.6532	NO	-	-
TOX-002-100307		92.3%	90.0%	95.0%	2.40%	0.2961	NO	0.0464	YES
TOX-001-100307		94.7%	88.9%	100.0%	5.04%	0.6240	NO	0.5019	NO
<i>Americamysis bahia</i>									
		Day 2 Survival							
Lab Control	8	97.5%	80.0%	100.0%	7.25%	-	-	-	-
TOX-003-100307		100.0%	100.0%	100.0%	0.00%	0.6395	NO	-	-
TOX-002-100307		100.0%	100.0%	100.0%	0.00%	0.6395	NO	0.4796	NO
TOX-001-100307		100.0%	100.0%	100.0%	0.00%	0.6395	NO	0.4796	NO
		Day 7 Survival							
Lab Control	8	97.5%	80.0%	100.0%	7.25%	-	-	-	-
TOX-003-100307		100.0%	100.0%	100.0%	0.00%	0.6395	NO	-	-
TOX-002-100307		97.5%	80.0%	100.0%	7.25%	0.4796	NO	0.3605	NO
TOX-001-100307		100.0%	100.0%	100.0%	0.00%	0.6395	NO	0.4796	NO
		Day 7 Dry Weight Biomass - mg							
Lab Control	8	0.352	0.214	0.424	17.53%	-	-	-	-
TOX-003-100307		0.415	0.348	0.456	8.47%	0.9875	NO	-	-
TOX-002-100307		0.431	0.360	0.514	11.69%	0.4796	NO	0.7666	NO
TOX-001-100307		0.580	0.516	0.664	8.29%	1.0000	NO	1.0000	NO
<i>Champia parvula</i>									
		Day 2 Survival							
Lab Control	4	100.0%	100.0%	100.0%	0.00%	-	-	-	-
TOX-003-100307		100.0%	100.0%	100.0%	0.00%	0.4796	NO	-	-
TOX-002-100307		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
TOX-001-100307		100.0%	100.0%	100.0%	0.00%	0.4796	NO	0.4796	NO
		Day 7 Mean # Cystocarps							
Lab Control	4	16.55	12.40	19.40	18.10%	-	-	-	-
TOX-003-100307		11.40	8.00	17.80	38.41%	0.0501	NO	-	-
TOX-002-100307		9.65	6.60	12.60	27.04%	0.0066	YES	0.2590	NO
TOX-001-100307		0.00	0.00	0.00	0.00%	0.0000	YES	0.0010	YES

Table 6. Summary of “As Received” Sample Physical and Chemical Characteristics. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Sample ID	Lab Code	Ammonia (mg/L)	pH (SU)	Salinity (‰)	Specific Conductance (µmhos/cm)	Total Residual Chlorine (mg/L)
WQ-TOX-001-080907	16150-001	<0.1	7.36	30	44910	<0.05
WQ-TOX-002-080907	16150-002	<0.1	7.26	30	45100	<0.05
WQ-TOX-003-080907	16150-003	<0.1	7.38	30	45260	<0.05
WQ-TOX-004-080907	16150-004	<0.1	7.39	30	44960	<0.05
WQ-TOX-001-091107	16234-001	<0.1	6.96	31	45540	<0.05
WQ-TOX-002-091107	16234-002	<0.1	6.99	31	47230	<0.05
WQ-TOX-003-091107	16234-003	<0.1	6.99	31	47740	<0.05
WQ-TOX-001-100307	16391-001	0.16	7.51	31	41300	<0.05
WQ-TOX-002-100307	16391-002	0.12	7.66	30	41200	<0.05
WQ-TOX-003-100307	16391-003	<0.1	7.72	31	41200	<0.05

Table 7. Reference Toxicant Summary. New Bedford Harbor Surface Water Monitoring Program. Fall 2007.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
<i>A. bahia</i>						
08/08/07	Survival	LC-50	19.4	21.2	16.4 - 26.0	SDS (mg/L)
09/04/07	Survival	LC-50	25.1	21.2	6.26 - 26.18	SDS (mg/L)
10/02/07	Survival	LC-50	17.2	21.0	15.8 - 26.3	SDS (mg/L)
08/08/07	Survival	C-NOEC	15.0	15.0	10.0 - 25.0	SDS (mg/L)
08/08/07	Growth	C-NOEC	15.0	10.0	5.0 - 15.0	SDS (mg/L)
<hr/>						
<i>A. Punctulata</i>						
08/17/07	Fertilization	C-NOEC	40.0	20.0	10.0 - 40.0	Copper (µg/L)
08/17/07	Fertilization	IC-25	80.0	45.0	0.0 - 101.8	Copper (µg/L)
10/04/07	Fertilization	C-NOEC	20.0	20.0	10.0 - 40.0	Copper (µg/L)
10/04/07	Fertilization	IC-25	43.7	45.0	0.0 - 101.8	Copper (µg/L)
<hr/>						
08/29/07	Cystocarp	IC-50	0.08	0.12	0.0 - 0.27	SDS (mg/L)
10/17/07	Cystocarp	IC-50	0.06	0.12	0.0 - 0.27	SDS (mg/L)
<hr/>						
Mean and Acceptable Ranges based on most recent 20 reference toxicant assays (NELAP standard)						

APPENDIX A SUPPORT DATA

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METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays:	
<i>Ceriodaphnia dubia</i> , <i>Daphnia pulex</i>	EPA-821-R-02-012
<i>Pimephales promelas</i>	EPA-821-R-02-012
<i>Americamysis bahia</i>	EPA-821-R-02-012
<i>Menidia beryllina</i> , <i>Cyprinodon variegatus</i>	EPA-821-R-02-012
Chronic Exposure Bioassays:	
<i>Ceriodaphnia dubia</i>	EPA-821-R-02-013 1002.0
<i>Pimephales promelas</i>	EPA-821-R-02-013 1000.0
<i>Cyprinodon variegatus</i>	EPA-821-R-02-014 1004.0
<i>Menidia beryllina</i>	EPA-821-R-02-014 1006.0
<i>Arbacia punctulata</i>	EPA-821-R-02-014 1008.0
<i>Champia parvula</i>	EPA-821-R-02-014 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20 th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20 th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20 th Edition - Method 5310C
Specific Conductance	Standard Methods 20 th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20 th Edition - Method 4500NH3G
pH	Standard Methods 20 th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20 th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20 th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20 th Edition - Method 4500-O G

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY: 10150		CLIENT: Battelle				LOCATION: NEW BEDFORD				LAB CONTROL: HAMPTON ESTUARY				ORGANISM BATCH/LOT#			
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
Lab Control	A	5	5	5	5	5	5	5	5	5.8	6.0	5.9	6.0	5.6	5.2	6.6	
	B	5	3	3	3	3	3	3	3	5.8	6.1	6.0	6.0	5.6	5.6	6.5	
	C	5	5	5	5	5	5	5	5	5.8	5.1	5.6	5.9	5.5	5.6	6.5	
	D	5	5	5	5	5	5	5	5	5.9	5.4	5.6	5.7	5.6	5.5	6.4	
	E	5	5	5	5	5	5	5	5	5.9	5.9	5.8	5.7	5.4	5.5	6.4	
	F	5	5	5	5	5	5	5	5	5.8	5.7	5.7	5.6	5.6	5.4	6.4	
	G	5	5	4	4	4	4	4	4	5.8	5.4	5.5	5.6	5.6	4.6	6.4	
	H	5	5	5	5	5	5	5	5	5.9	5.5	5.6	5.4	5.6	5.0	6.5	
-001	A	5	4	4	4	4	4	4	4	5.9	5.7	5.6	5.6	5.6	5.5	6.4	
	B	5	5	5	5	5	5	5	5	5.9	5.7	5.6	5.6	5.5	4.9	6.3	
	C	5	5	5	5	5	5	5	5	5.8	5.5	5.5	5.4	5.3	4.9	6.3	
	D	5	5	5	5	5	5	5	5	5.7	5.3	5.4	5.4	5.3	4.9	6.4	
	E	5	5	5	5	5	5	5	5	5.7	5.3	5.4	5.4	5.4	5.1	6.4	
	F	5	5	5	5	5	5	5	5	5.7	5.5	5.4	5.5	5.3	5.0	6.4	
	G	5	5	5	5	5	5	5	5	5.6	5.6	5.5	5.6	5.4	4.7	6.3	
	H	5	5	5	5	5	5	5	5	5.8	5.5	5.6	5.4	5.4	4.9	6.3	
-002	A	5	5	5	5	5	5	5	5	5.9	5.6	5.7	5.5	5.3	5.0	6.3	
	B	5	5	5	5	5	5	5	5	5.9	5.6	5.7	5.5	4.8	4.7	6.2	
	C	5	5	4	4	4	4	4	4	5.8	5.8	5.7	5.6	5.4	4.2	6.3	
	D	5	5	5	5	5	5	5	5	5.8	5.7	5.6	5.6	4.6	4.6	6.3	
	E	5	5	5	5	5	5	5	5	5.9	5.7	5.6	5.4	5.2	5.0	6.3	
	F	5	5	5	5	5	5	5	5	5.8	5.7	5.6	5.5	5.3	5.0	6.3	
	G	5	5	5	5	5	5	5	5	5.8	5.3	5.5	5.5	5.3	4.9	6.4	
	H	5	5	5	5	5	5	5	5	5.8	5.8	5.7	5.6	5.2	5.0	6.3	
INC TEMP:		25	26	26	26	26	26	26	26								
DATE:		8/9/07	8/10	8/11	8/12	8/13	8/14	8/15	8/16								
TIME:		1620	0845	1342	0940	1100	1000	1515	1045								
INITIALS:		SJ	RAM	CS	SJ	SJ	RAM	Jm	SJ								

*
on Air 8/15

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY: 16150		CLIENT: Battelle		LOCATION: NEW BEDFORD		LAB CONTROL: HAMPTON ESTUARY		ORGANISM BATCH/LOT#									
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
-003	A	5	5	5	5	5	5	5	5	5.8	5.3	5.4	5.6	5.3	5.0	6.1	
	B	5	5	5	5	5	5	5	5	5.7	5.3	5.4	5.6	5.4	4.6	6.2	
	C	5	5	5	5	5	5	5	5	5.7	5.2	5.3	5.5	5.4	4.9	6.3	
	D	5	5	5	5	5	5	5	5	5.7	5.1	5.4	5.4	5.5	5.0	6.4	
	E	5	5	4	4	4	4	4	4	5.8	5.4	5.4	5.4	5.5	2.5	6.4	
	F	5	5	5	5	5	5	5	5	5.7	5.2	5.3	5.3	5.5	4.6	6.3	
	G	5	5	4	4	4	4	4	4	5.7	5.0	5.2	5.2	5.5	4.0	6.4	
	H	5	5	5	5	5	5	5	5	5.7	5.2	5.2	5.2	4.5	4.1	6.4	
-004	A	5	5	5	5	5	5	5	5	5.9	5.6	5.4	5.3	5.2	4.5	6.4	
	B	5	5	5	5	5	5	5	5	5.8	5.5	5.6	5.2	5.2	5.0	6.5	
	C	5	5	5	5	5	5	5	5	5.8	5.5	5.4	5.3	5.2	5.0	6.4	
	D	5	5	5	5	5	5	5	5	5.9	5.5	5.4	5.4	5.0	5.0	6.4	
	E	5	4	4	4	4	4	4	4	5.9	5.4	5.3	5.6	5.3	5.0	6.2	
	F	5	5	5	5	5	5	5	5	5.9	5.8	5.7	5.7	5.3	5.0	6.1	
	G	5	5	5	4	4	4	4	4	5.9	5.8	5.7	5.6	4.6	5.0	6.2	
	H	5	5	5	5	5	5	5	5	5.9	5.4	5.3	5.6	5.1	4.4	6.2	
INC TEMP:		25	26	26	26	26	26	26	26								
DATE:		8/4/07	8/10	8/11	8/12	8/13	8/14	8/15	8/16								
TIME:		1620	0845	1349	0940	1100	1000	1575	1045								
INITIALS:		SS	RAM	CS	SS	SS	RAM	AM	SS								

**Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS**

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES: 8/9/07 - 8/16/07				
STUDY #: 16150				SPECIES: A. bahia				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
Lab	A	0.20791	0.20978					
	B	0.20911	0.20980					
	C	0.20854	0.21069					
	D	0.21283	0.21475 0.21043 ²					
	E	0.20907	0.21130 0.21475 ³					
	F	0.20692	0.20916					
	G	0.20988	0.21117					
	H	0.20850	0.21012 0.20913 ³					
-001	A	0.20948	0.21136					
	B	0.20815	0.20980					
	C	0.20762	0.21092					
	D	0.20834	0.21148 0.2119 ³					
	E	0.20898	0.21133					
	F	0.20972	0.21226					
	G	0.20973	0.21197					
	H	0.20917	0.21100					
-002	A	0.20969	0.21166					
	B	0.20921	0.21135					
	C	0.20766	0.20963					
	D	0.20914	0.21219					
	E	0.20851	0.21038					
	F	0.20701	0.20858					
	G	0.20964	0.21162					
	H	0.20791	0.21028					
DATE		8/16/07	8/18/07					
TIME		1005	1330					
INITIALS		SJ	RAM					

**Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS**

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES: 8/9/07 - 8/16/07				
STUDY #: 10150				SPECIES: A. bahia				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	0.20952	0.21186					
	B	0.20951	0.21167					
	C	0.20928	0.21165					
	D	0.20892	0.21131					
	E	0.20825	0.21015					
	F	0.20882	0.21106					
	G	0.20780	0.20917					
	H	0.20785	0.21053					
-004	A	0.20961	0.21144					
	B	0.20947	0.21128					
	C	0.20660	0.20860					
	D	0.20679	0.20879					
	E	0.21002	0.21178 0.20963					
	F	0.20846	0.21047					
	G	0.21030	0.21194					
	H	0.20961	0.21143					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE			08/18/07					
TIME			1330					
INITIALS			RAM					



Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICANYSIS bahia

Source: Lab reared ☒ Hatchery reared ☐ Field collected ☐

Hatch date 8-2-07 Receipt date

Lot number 080207MS Strain

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ~30 ppt DO

pH 7.8 Hardness ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ☒ Phytoplankton ☐ Trout Chow ☒

Brine Shrimp ☒ Rotifers ☐ Other ENCAP. SHRIMP DIET

Prophylactic Treatments:

Comments:

IV. Shipping Information

Client: EST # of Organisms: 200+

Carrier: Date Shipped: 8-9-07

Biologist: Mark Thompson

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

CETIS Test Summary

Page 1 of 3
 Report Date: 21 Aug-07 2:04 PM
 Link: 09-0394-9498

Americamysis 7-d Survival, Growth and Fecundity Test			EnviroSystems, Inc.
Test No: 07-1279-8610	Test Type: Growth-Survival-Fec (7d)	Duration: 6d 18h	
Start Date: 09 Aug-07 04:20 PM	Protocol: EPA/821/R-02-014 (2002)	Species: Americamysis bahia	
Ending Date: 16 Aug-07 10:45 AM	Dil Water: Not Applicable	Source: ARO - Aquatic Research Organisms, N	
Setup Date: 09 Aug-07 04:20 PM	Brine: Not Applicable		
Sample No: 06-6444-1965	Material: Surface Water	Client: Battelle Labs	
Sample Date: 09 Aug-07 04:00 PM	Code: 16150-000	Project: Ecological Risk Assessment	
Receive Date: 09 Aug-07 04:00 PM	Source: New Bedford Harbor Dredge Monitorin		
Sample Age: 20m	Station: Laboratory Water Control		
Sample No: 14-0079-4493	Material: Surface Water	Client: Battelle Labs	
Sample Date: 09 Aug-07 08:40 AM	Code: 16150-001	Project: Ecological Risk Assessment	
Receive Date: 09 Aug-07 02:55 PM	Source: New Bedford Harbor Dredge Monitorin		
Sample Age: 8h	Station: WQ-TOX-001		
Sample No: 18-5933-9189	Material: Surface Water	Client: Battelle Labs	
Sample Date: 09 Aug-07 09:15 AM	Code: 16150-002	Project: Ecological Risk Assessment	
Receive Date: 09 Aug-07 02:55 PM	Source: New Bedford Harbor Dredge Monitorin		
Sample Age: 7h	Station: WQ-TOX-002		
Sample No: 08-7827-7773	Material: Surface Water	Client: Battelle Labs	
Sample Date: 09 Aug-07 09:30 AM	Code: 16150-003	Project: Ecological Risk Assessment	
Receive Date: 09 Aug-07 02:55 PM	Source: New Bedford Harbor Dredge Monitorin		
Sample Age: 7h	Station: WQ-TOX-003		
Sample No: 04-4490-4090	Material: Surface Water	Client: Battelle Labs	
Sample Date: 09 Aug-07 10:05 AM	Code: 16150-004	Project: Ecological Risk Assessment	
Receive Date: 09 Aug-07 02:55 PM	Source: New Bedford Harbor Dredge Monitorin		
Sample Age: 6h	Station: WQ-TOX-004		

CETIS Test Summary

Report Date:

21 Aug-07 2:04 PM

Link:

09-0394-9498

2d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	8	0.92500	0.60000	1.00000	0.05261	0.14880	16.09%
16150-001	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16150-002	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16150-003	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16150-004	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	8	0.92500	0.60000	1.00000	0.05261	0.14880	16.09%
16150-001	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16150-002	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16150-003	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%
16150-004	8	0.95000	0.80000	1.00000	0.03273	0.09258	9.75%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	8	0.35025	0.13800	0.44800	0.03804	0.10759	30.72%
16150-001	8	0.47325	0.33000	0.66000	0.04271	0.12081	25.53%
16150-002	8	0.42300	0.31400	0.61000	0.03114	0.08806	20.82%
16150-003	8	0.43625	0.27400	0.53600	0.02796	0.07908	18.13%
16150-004	8	0.37175	0.32800	0.40200	0.00945	0.02674	7.19%

Mean Dry Weight-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	8	0.36981	0.23000	0.44800	0.02661	0.07526	20.35%
16150-001	8	0.48500	0.33000	0.66000	0.04045	0.11440	23.59%
16150-002	8	0.43531	0.31400	0.61000	0.03192	0.09029	20.74%
16150-003	8	0.45669	0.34250	0.53600	0.01947	0.05507	12.06%
16150-004	8	0.39300	0.36200	0.44000	0.00964	0.02728	6.94%

CETIS Test Summary

Report Date:

21 Aug-07 2:04 PM

Link:

09-0394-9498

2d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16150-000	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
16150-001	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16150-002	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000
16150-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
16150-004	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16150-000	1.00000	0.60000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000
16150-001	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16150-002	1.00000	1.00000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000
16150-003	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	0.80000	1.00000
16150-004	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	0.80000	1.00000

Mean Dry Biomass-mg Detail

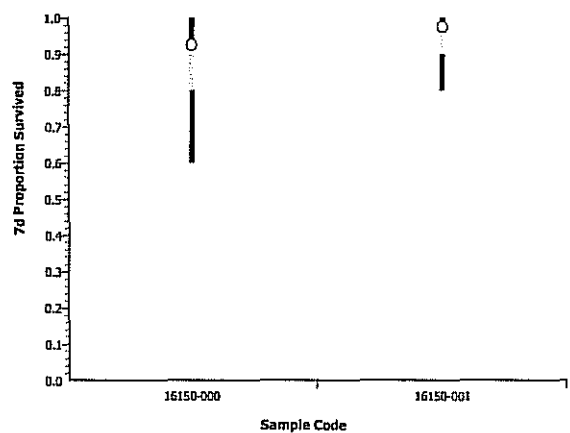
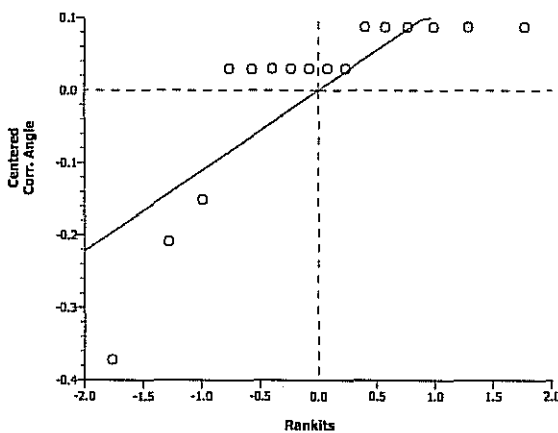
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16150-000	0.37400	0.13800	0.43000	0.38400	0.44600	0.44800	0.25800	0.32400
16150-001	0.37600	0.33000	0.66000	0.62800	0.47000	0.50800	0.44800	0.36600
16150-002	0.39400	0.42800	0.39400	0.61000	0.37400	0.31400	0.39600	0.47400
16150-003	0.46800	0.43200	0.47400	0.47800	0.38000	0.44800	0.27400	0.53600
16150-004	0.36600	0.36200	0.40000	0.40000	0.35200	0.40200	0.32800	0.36400

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16150-000	0.37400	0.23000	0.43000	0.38400	0.44600	0.44800	0.32250	0.32400
16150-001	0.47000	0.33000	0.66000	0.62800	0.47000	0.50800	0.44800	0.36600
16150-002	0.39400	0.42800	0.49250	0.61000	0.37400	0.31400	0.39600	0.47400
16150-003	0.46800	0.43200	0.47400	0.47800	0.47500	0.44800	0.34250	0.53600
16150-004	0.36600	0.36200	0.40000	0.40000	0.44000	0.40200	0.41000	0.36400

CETIS Analysis Detail

Comparisons: Page 3 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 06-7387-2594

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.									
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h						
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia						
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N						
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable										
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version					
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026					
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp						
Mann-Whitney U		C > T	Angular (Corrected)		N/A										
ANOVA Assumptions															
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)					
Variances		Variance Ratio		4.16757		8.88539		0.07923		Equal Variances					
Distribution		Shapiro-Wilk W		0.67052		0.84420		0.00001		Non-normal Distribution					
ANOVA Table															
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)			
Between		0.0131794		0.0131794		1		0.72		0.41055		Non-Significant Effect			
Error		0.2564119		0.0183151		14									
Total		0.26959125		0.0314945		15									
Group Comparisons															
Sample		vs		Sample		Statistic		Critical		P Level		Ties		Decision(0.05)	
16150-000				16150-001		27.5				0.6395		2		Non-Significant Effect	
Data Summary															
Sample Code		Count	Original Data				Transformed Data								
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD					
16150-000		8	0.92500	0.60000	1.00000	0.14880	1.25812	0.88608	1.34528	0.17188					
16150-001		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419					
Graphics															
															

CETIS Analysis Detail

Comparisons: Page 1 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 04-4557-4091

Americamysis 7-d Survival, Growth and Fecundity Test EnviroSystems, Inc.

Test No:	07-1279-8610	Test Type:	Growth-Survival-Fec (7d)	Duration:	6d 18h
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia
Ending Date:	16 Aug-07 10:45 AM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	09-0394-9498	09-0394-9498	21 Aug-07 1:42 PM	CETISv1.026

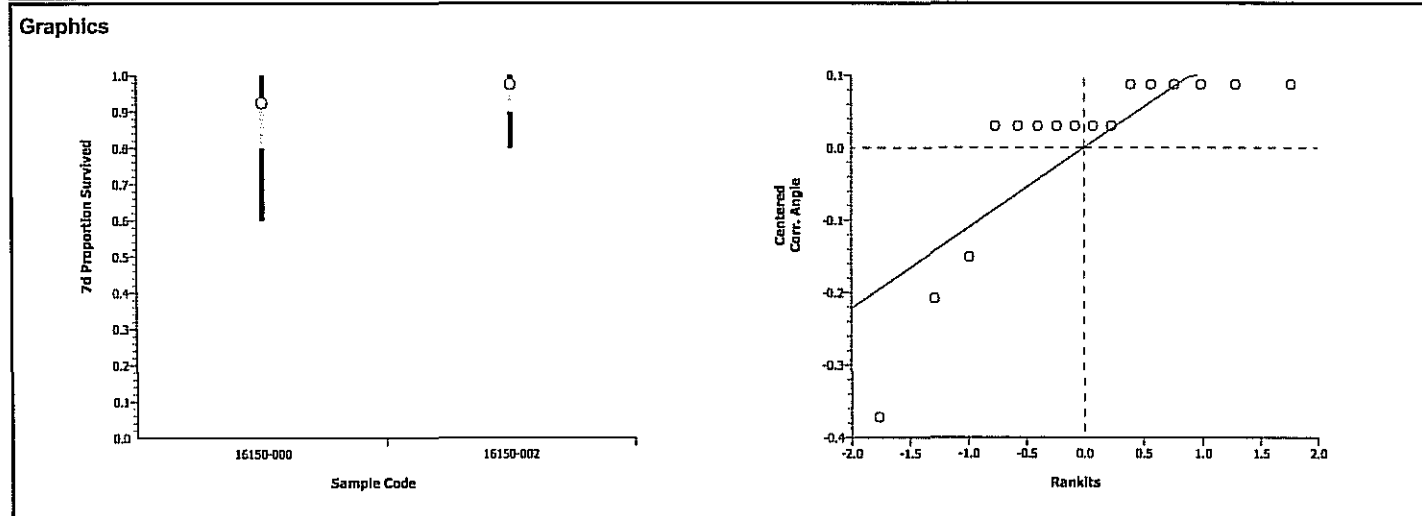
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	4.16757	8.88539	0.07923	Equal Variances
Distribution	Shapiro-Wilk W	0.67052	0.84420	0.00001	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0131794	0.0131794	1	0.72	0.41055	Non-Significant Effect
Error	0.2564119	0.0183151	14			
Total	0.26959125	0.0314945	15			

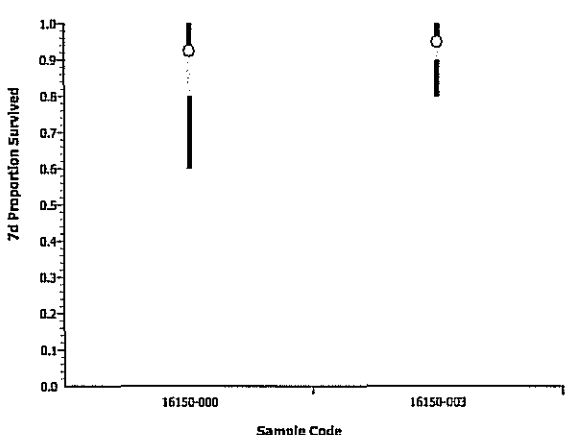
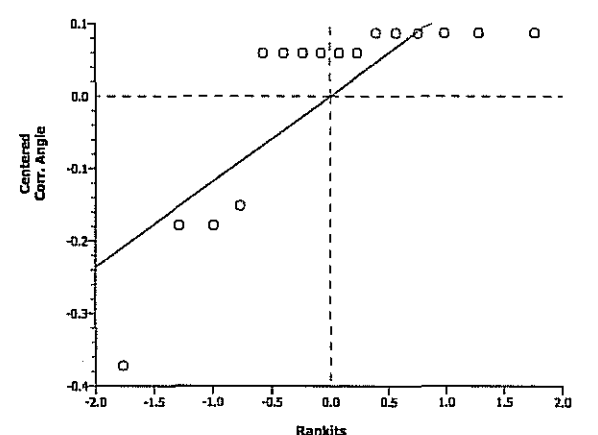
Group Comparisons							
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
16150-000		16150-002	27.5		0.6395	2	Non-Significant Effect

Data Summary		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	8	0.92500	0.60000	1.00000	0.14880	1.25812	0.88608	1.34528	0.17188
16150-002	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419

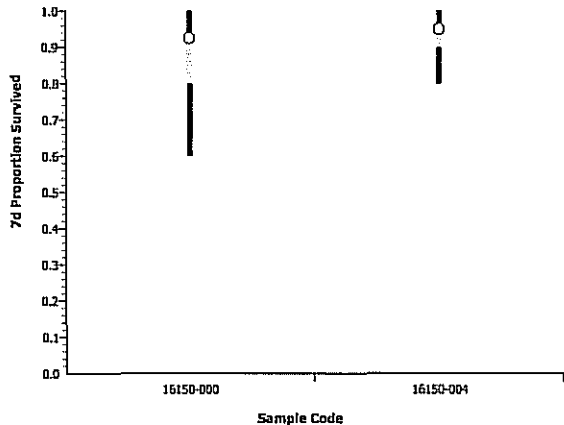
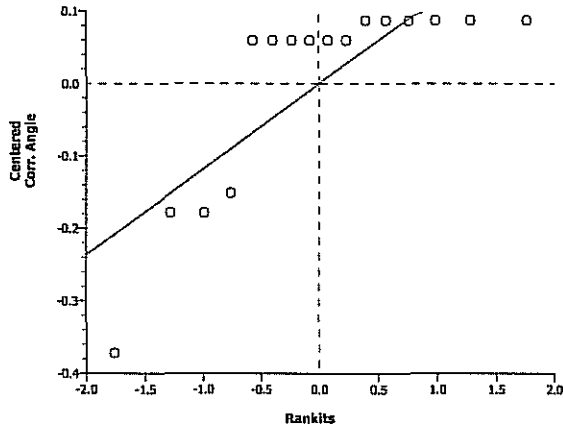


CETIS Analysis Detail

Comparisons: Page 4 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 08-8976-5697

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.					
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h		
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia		
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026	
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U		C > T	Angular (Corrected)			N/A					
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		2.43108		8.88539		0.26405		Equal Variances	
Distribution		Shapiro-Wilk W		0.66203		0.84420		0.00001		Non-normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		0.0030545		0.0030545		1		0.15		0.70763	
Error		0.2918543		0.0208467		14					
Total		0.29490886		0.0239013		15					
Group Comparisons											
Sample		vs	Sample		Statistic		Critical		P Level		Ties
16150-000			16150-003		31				0.5204		2
											Decision(0.05)
											Non-Significant Effect
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count		Mean		Minimum		Maximum		SD	
16150-000		8		0.92500		0.60000		1.00000		0.14880	
16150-003		8		0.95000		0.80000		1.00000		0.09258	
Graphics											
											

CETIS Analysis Detail

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.					
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h		
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia		
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026	
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Mann-Whitney U		C > T	Angular (Corrected)		N/A						
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		2.43108		8.88539		0.26405		Equal Variances	
Distribution		Shapiro-Wilk W		0.66203		0.84420		0.00001		Non-normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		0.0030545		0.0030545		1		0.15		0.70763	
Error		0.2918543		0.0208467		14					
Total		0.29490886		0.0239013		15					
Group Comparisons											
Sample		vs	Sample		Statistic		Critical		P Level		Ties
16150-000			16150-004		31				0.5204		2
											Decision(0.05)
											Non-Significant Effect
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count		Mean		Minimum		Maximum		SD	
16150-000		8		0.92500		0.60000		1.00000		0.14880	
16150-004		8		0.95000		0.80000		1.00000		0.09258	
Graphics											
											

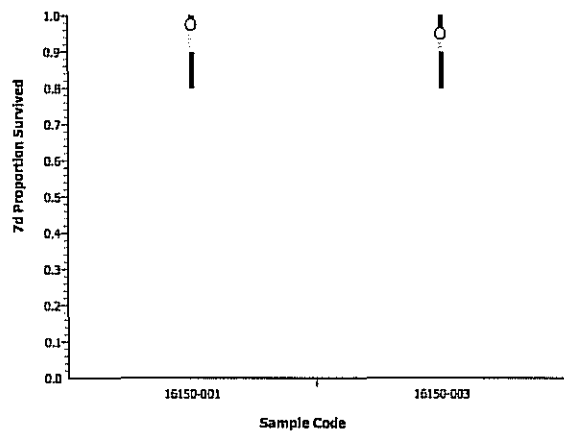
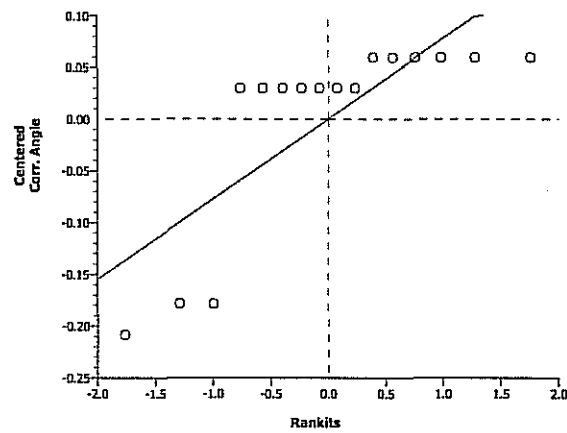
CETIS Analysis Detail

Comparisons: Page 2 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 05-6437-7402

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.					
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 18h			
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia			
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026	
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U		C > T	Angular (Corrected)			N/A					
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		1.00000		8.88539		1.00000		Equal Variances	
Distribution		Shapiro-Wilk W		0.39803		0.84420		0.00000		Non-normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		0		0		1		0.00		1.00000	
Error		0.0992388		0.0070885		14					
Total		0.09923882		0.0070885		15					
Group Comparisons											
Sample		vs	Sample		Statistic		Critical		P Level		Ties
16150-001			16150-002		32				0.4796		2
											Decision(0.05)
											Non-Significant Effect
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count		Mean		Minimum		Maximum		SD	
16150-001		8		0.97500		0.80000		1.00000		0.07071	
16150-002		8		0.97500		0.80000		1.00000		0.07071	
Graphics											

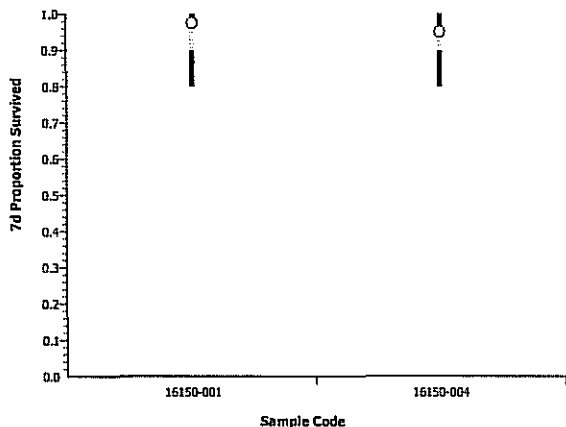
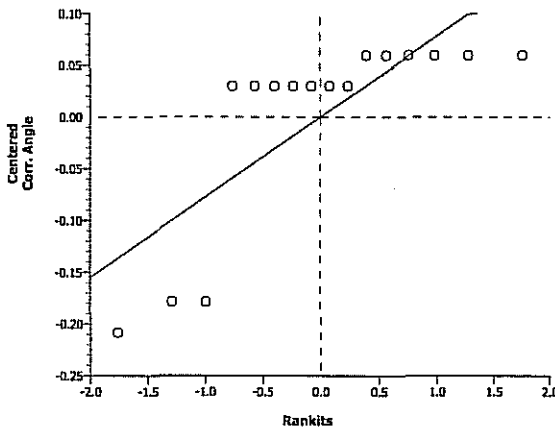
CETIS Analysis Detail

Comparisons: Page 5 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 15-7086-8898

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.								
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 18h						
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia						
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N						
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable									
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026				
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units		ChV	MSDp			
Mann-Whitney U		C > T	Angular (Corrected)			N/A								
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		1.71429		8.88539		0.49388		Equal Variances				
Distribution		Shapiro-Wilk W		0.61116		0.84420		0.00000		Non-normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		0.0035442		0.0035442		1		0.37		0.55358		Non-Significant Effect		
Error		0.1346813		0.0096201		14								
Total		0.1382255		0.0131643		15								
Group Comparisons														
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)	
16150-001			16150-003		36				0.3605		2		Non-Significant Effect	
Data Summary														
Sample Code		Count	Original Data				Transformed Data							
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
16150-001		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419				
16150-003		8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023				
Graphics														
														

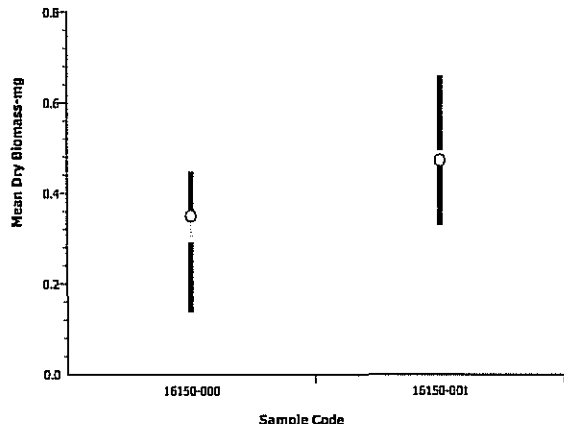
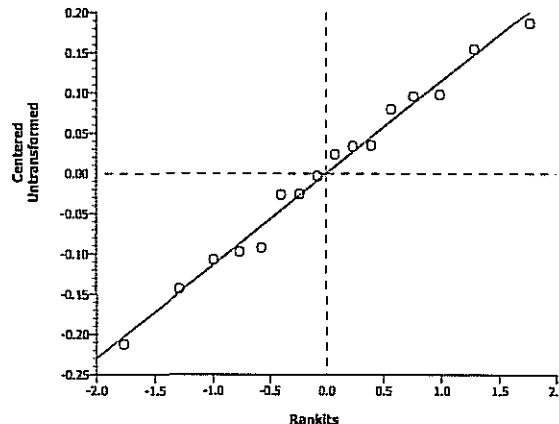
CETIS Analysis Detail

Comparisons: Page 6 of 7
 Report Date: 21 Aug-07 1:46 PM
 Analysis: 17-2897-7763

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.								
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 18h						
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia						
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N						
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable									
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
7d Proportion Survived		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026				
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp					
Mann-Whitney U		C > T	Angular (Corrected)		N/A									
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		1.71429		8.88539		0.49388		Equal Variances				
Distribution		Shapiro-Wilk W		0.61116		0.84420		0.00000		Non-normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		0.0035442		0.0035442		1		0.37		0.55358		Non-Significant Effect		
Error		0.1346813		0.0096201		14								
Total		0.1382255		0.0131643		15								
Group Comparisons														
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)	
16150-001			16150-004		36				0.3605		2		Non-Significant Effect	
Data Summary														
Sample Code		Count	Original Data				Transformed Data							
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
16150-001		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419				
16150-004		8	0.95000	0.80000	1.00000	0.09258	1.28575	1.10715	1.34528	0.11023				
Graphics														
														

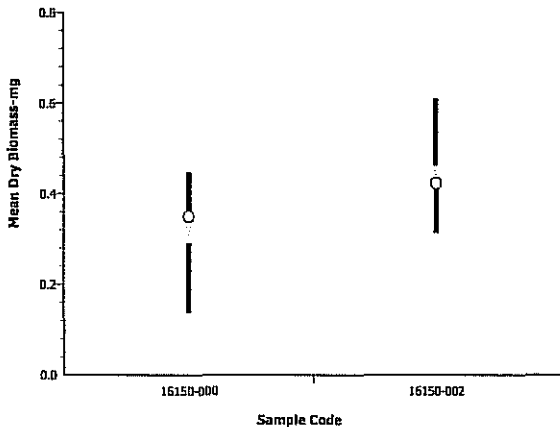
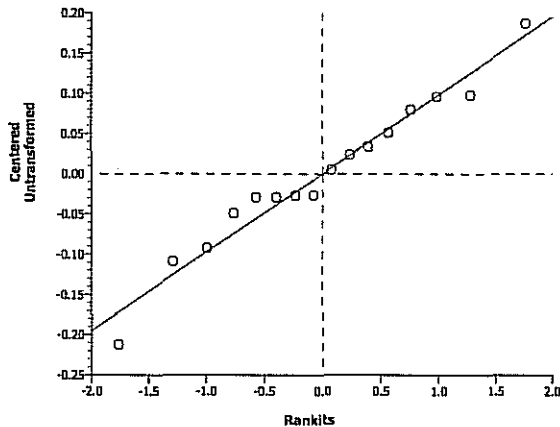
CETIS Analysis Detail

Comparisons: Page 4 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 08-2298-0895

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.								
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h					
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia					
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N					
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable									
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
Mean Dry Biomass-mg		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:42 PM		CETISv1.026				
Method		Alt H		Data Transform		Z		NOEL		LOEL		Toxic Units	ChV	MSDp
Equal Variance t		C > T		Untransformed								N/A		
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		1.26068		8.88539		0.76768		Equal Variances				
Distribution		Shapiro-Wilk W		0.98100		0.84420		0.95262		Normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		0.0605160		0.0605160		1		4.62		0.04947		Significant Effect		
Error		0.1831949		0.0130854		14								
Total		0.24371094		0.0736014		15								
Group Comparisons														
Sample		vs		Sample		Statistic		Critical		P Level		MSD		Decision(0.05)
16150-000				16150-001		-2.1505		1.76131		0.9753		0.10074		Non-Significant Effect
Data Summary														
Sample Code		Count	Original Data				Transformed Data							
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
16150-000		8	0.35025	0.13800	0.44800	0.10759								
16150-001		8	0.47325	0.33000	0.66000	0.12081								
Graphics														
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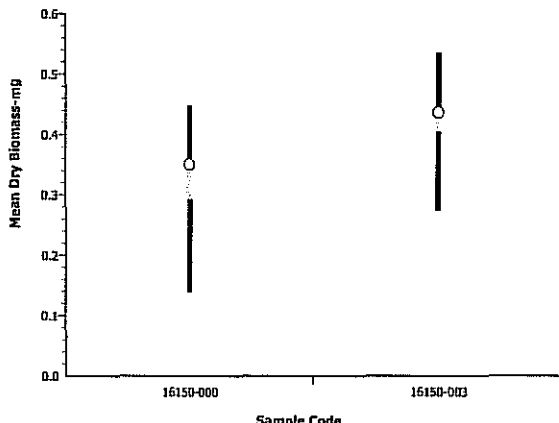
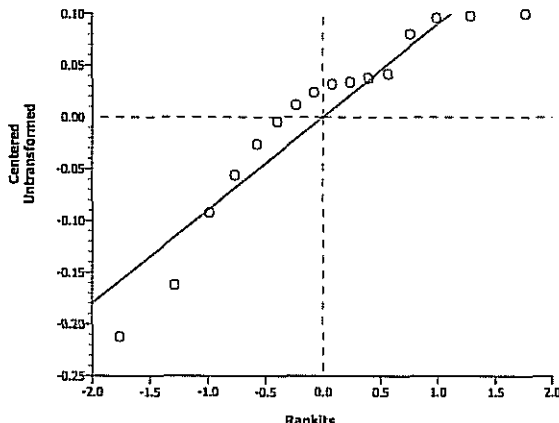
CETIS Analysis Detail

Comparisons: Page 2 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 06-9799-4703

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.								
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 18h						
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia						
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N						
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable									
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
Mean Dry Biomass-mg		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:43 PM		CETISv1.026				
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp					
Equal Variance t		C > T	Untransformed		N/A									
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		1.49270		8.88539		0.61022		Equal Variances				
Distribution		Shapiro-Wilk W		0.97774		0.84420		0.91772		Normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		0.0211702		0.0211702		1		2.19		0.16104		Non-Significant Effect		
Error		0.1353234		0.009666		14								
Total		0.15649364		0.0308362		15								
Group Comparisons														
Sample		vs	Sample		Statistic		Critical		P Level		MSD		Decision(0.05)	
16150-000			16150-002		-1.4799		1.76131		0.9195		0.08658		Non-Significant Effect	
Data Summary														
Sample Code		Count	Original Data				Transformed Data							
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
16150-000		8	0.35025	0.13800	0.44800	0.10759								
16150-002		8	0.42300	0.31400	0.61000	0.08806								
Graphics														
														

CETIS Analysis Detail

Page 7 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 16-6124-1024

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.					
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h		
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia		
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
Mean Dry Biomass-mg		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:43 PM		CETISv1.026	
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Equal Variance t		C > T	Untransformed		N/A						
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		1.85133		8.88539		0.43514		Equal Variances	
Distribution		Shapiro-Wilk W		0.88621		0.84420		0.04823		Normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		0.029584		0.029584		1		3.32		0.08993	
Error		0.124807		0.0089148		14					
Total		0.15439094		0.0384988		15					
Group Comparisons											
Sample		vs Sample		Statistic		Critical		P Level		MSD	
16150-000		16150-003		-1.8217		1.76131		0.9550		0.08315	
										Decision(0.05)	
										Non-Significant Effect	
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
16150-000		8	0.35025	0.13800	0.44800	0.10759					
16150-003		8	0.43625	0.27400	0.53600	0.07908					
Graphics											
											

CETIS Analysis Detail

Comparisons: Page 1 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 06-6482-8280

Americamysis 7-d Survival, Growth and Fecundity Test EnviroSystems, Inc.

Test No:	07-1279-8610	Test Type:	Growth-Survival-Fec (7d)	Duration:	6d 18h
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia
Ending Date:	16 Aug-07 10:45 AM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	09-0394-9498	09-0394-9498	21 Aug-07 1:43 PM	CETISv1.026

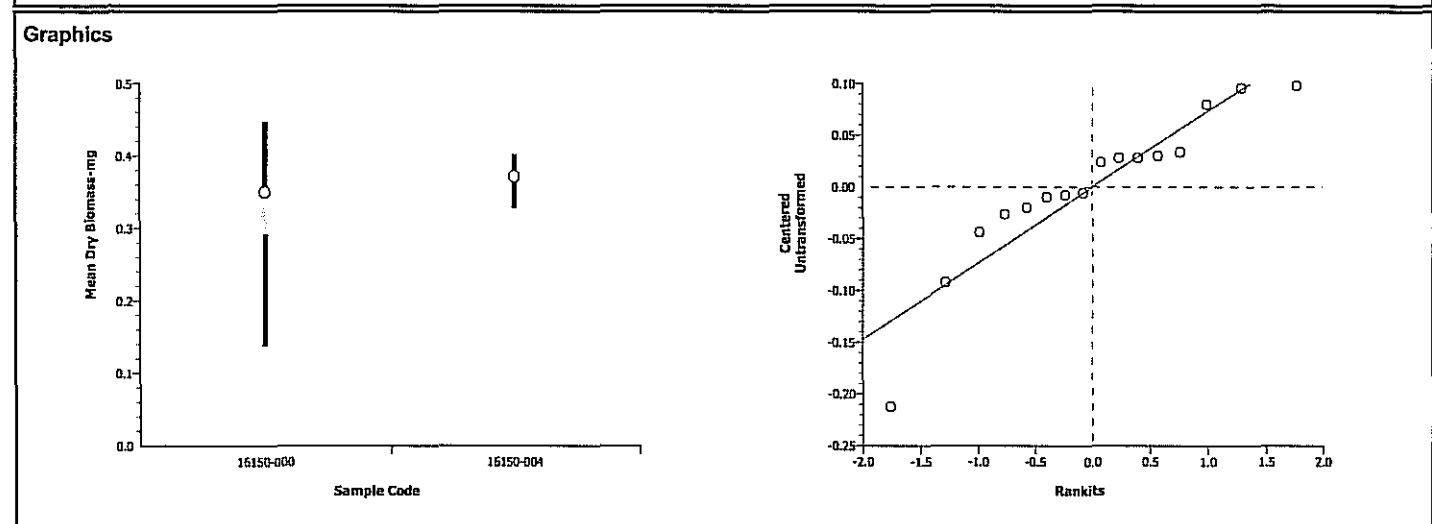
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	16.19568	8.88539	0.00157	Unequal Variances
Distribution	Shapiro-Wilk W	0.87975	0.84420	0.03789	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.001849	0.001849	1	0.30	0.59198	Non-Significant Effect
Error	0.086039	0.0061456	14			
Total	0.08788798	0.0079946	15			

Group Comparisons						
Sample	vs	Sample	Statistic	Critical	P Level	MSD
16150-000		16150-004	-0.5485	1.89458	0.6998	0.07426
						Decision(0.05)
						Non-Significant Effect

Data Summary		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	8	0.35025	0.13800	0.44800	0.10759				
16150-004	8	0.37175	0.32800	0.40200	0.02674				



CETIS Analysis Detail

Comparisons: Page 5 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 08-2567-3574

Americamysis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 07-1279-8610	Test Type: Growth-Survival-Fec (7d)	Duration: 6d 18h
Start Date: 09 Aug-07 04:20 PM	Protocol: EPA/821/R-02-014 (2002)	Species: Americamysis bahia
Ending Date: 16 Aug-07 10:45 AM	Dil Water: Not Applicable	Source: ARO - Aquatic Research Organisms, N
Setup Date: 09 Aug-07 04:20 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	09-0394-9498	09-0394-9498	21 Aug-07 1:43 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.88181	8.88539	0.42325	Equal Variances
Distribution	Shapiro-Wilk W	0.90448	0.84420	0.09508	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0101003	0.0101003	1	0.90	0.35788	Non-Significant Effect
Error	0.1564474	0.0111748	14			
Total	0.16654767	0.0212751	15			

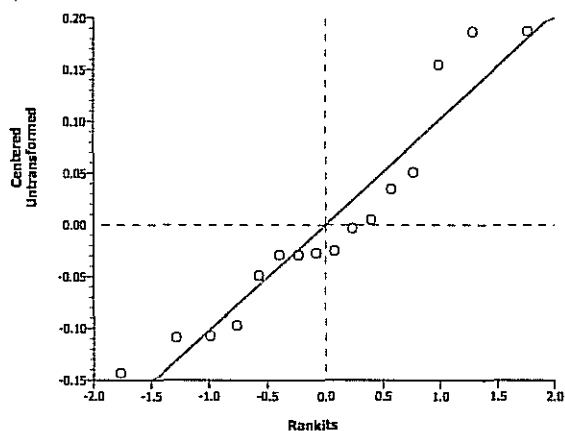
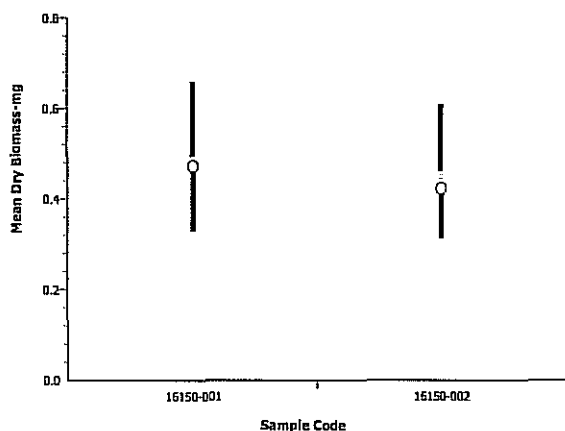
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16150-001		16150-002	0.95071	1.76131	0.1789	0.09309	Non-Significant Effect

Data Summary

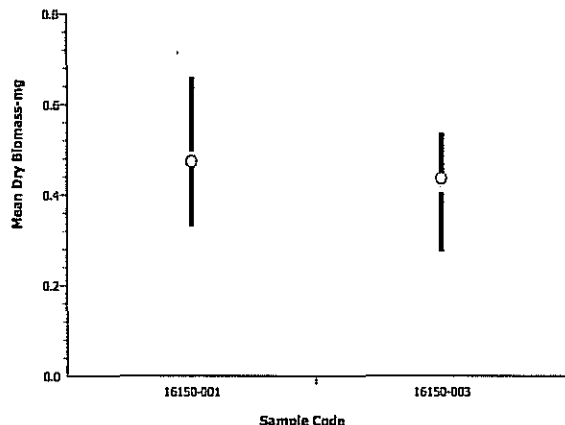
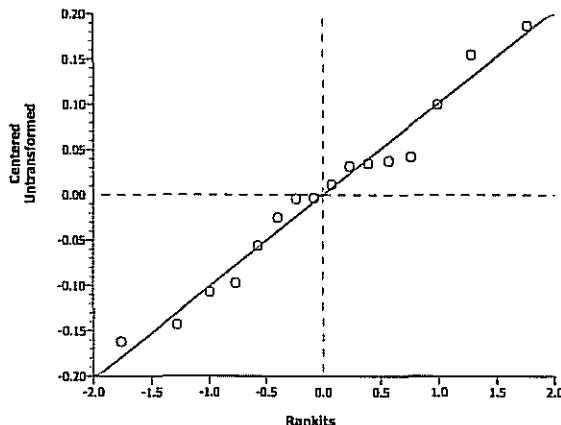
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	8	0.47325	0.33000	0.66000	0.12081				
16150-002	8	0.42300	0.31400	0.61000	0.08806				

Graphics



CETIS Analysis Detail

Comparisons: Page 3 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 08-1150-9228

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.													
Test No:	07-1279-8610		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 18h										
Start Date:	09 Aug-07 04:20 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia										
Ending Date:	16 Aug-07 10:45 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N										
Setup Date:	09 Aug-07 04:20 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
Mean Dry Biomass-mg		Comparison		09-0394-9498		09-0394-9498		21 Aug-07 1:43 PM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp									
Equal Variance t		C > T	Untransformed			N/A													
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Variance Ratio		2.33393		8.88539		0.28596		Equal Variances									
Distribution		Shapiro-Wilk W		0.96721		0.84420		0.75694		Normal Distribution									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0.0054760		0.0054760		1		0.53		0.48051		Non-Significant Effect							
Error		0.1459309		0.0104236		14													
Total		0.15140696		0.0158997		15													
Group Comparisons																			
Sample		vs		Sample		Statistic		Critical		P Level		MSD		Decision(0.05)					
16150-001				16150-003		0.72481		1.76131		0.2403		0.08991		Non-Significant Effect					
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
16150-001		8		0.47325		0.33000		0.66000		0.12081									
16150-003		8		0.43625		0.27400		0.53600		0.07908									
Graphics																			
																			
																			

CETIS Analysis Detail

Comparisons: Page 6 of 7
 Report Date: 21 Aug-07 1:47 PM
 Analysis: 08-5124-9044

Americamysis 7-d Survival, Growth and Fecundity Test				EnviroSystems, Inc.	
Test No:	07-1279-8610	Test Type:	Growth-Survival-Fec (7d)	Duration:	6d 18h
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Americamysis bahia
Ending Date:	16 Aug-07 10:45 AM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	09-0394-9498	09-0394-9498	21 Aug-07 1:43 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Unequal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	20.41750	8.88539	0.00075	Unequal Variances
Distribution	Shapiro-Wilk W	0.91808	0.84420	0.15659	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0412090	0.0412090	1	5.38	0.03594	Significant Effect
Error	0.107163	0.0076545	14			
Total	0.14837201	0.0488635	15			

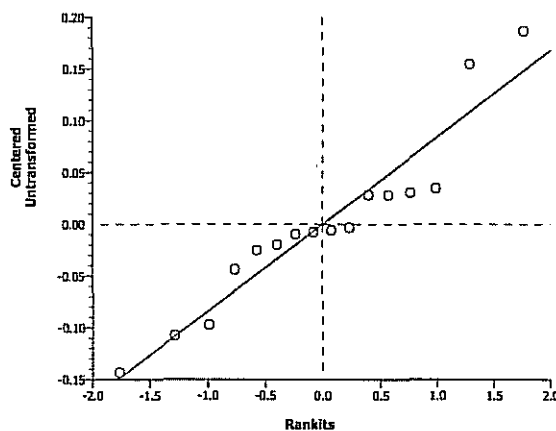
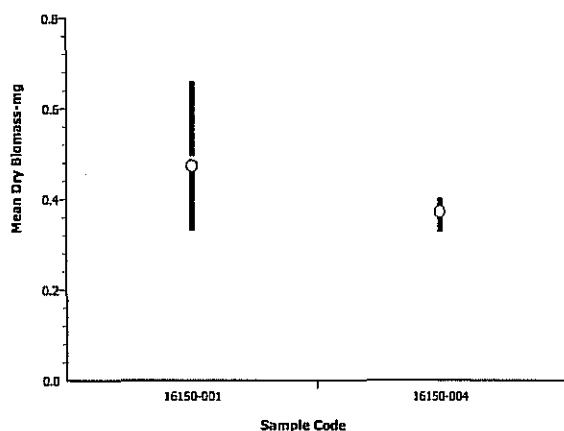
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16150-001		16150-004	2.32027	1.89458	0.0267	0.08288	Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	8	0.47325	0.33000	0.66000	0.12081				
16150-004	8	0.37175	0.32800	0.40200	0.02674				

Graphics



***Arbacia punctulata* Chronic Fertilization Assay**

SAMPLE USE RECORD

STUDY: 16150		CLIENT: Battelle - New Bedford
SPECIES: <i>A. punctulata</i>		
Day: 0		
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	200	N/A
-001	↓	-001
-002	↓	-002
-003	↓	-003
-004	↓	-004
INITIALS:	BB	
TIME:	1545	
DATE:	8/9/07	

FERTILIZATION COUNTS

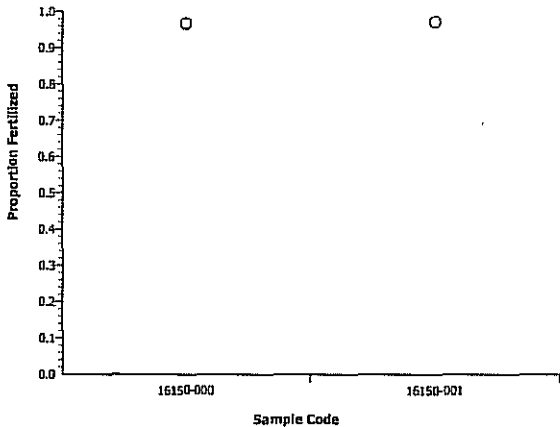
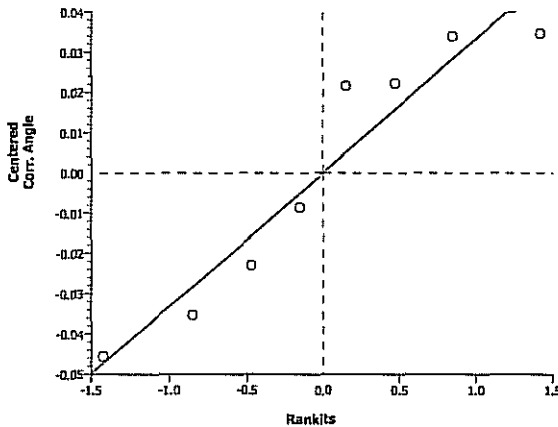
STUDY	CLIENT	LOCATION	DATE	INITIALS
	BATTELLE	New Bedford	8/10/07	BB
SAMPLE	REPLICATE VIAL			
	1	2	3	4
	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	100/105	100/102	100/104	101/103
-001	100/102	100/104	101/104	101/103
-002	100/104	100/105	101/102	102/106
-003	100/102	100/103	100/102	101/103
-004	102/105	101/109	100/103	100/111

CETIS Test Summary

Report Date: 21 Aug-07 1:59 PM
Link: 02-1118-1875

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.	
Test No:	03-9154-3054	Test Type:	Fertilization			Duration:	80m
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)			Species:	Arbacia punctulata
Ending Date:	09 Aug-07 05:40 PM	Dil Water:	Not Applicable			Source:	In-House Culture
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable				
Sample No:	06-6444-1965	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 04:00 PM	Code:	16150-000			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	20m	Station:	Laboratory Water Control				
Sample No:	14-0079-4493	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 08:40 AM	Code:	16150-001			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	8h	Station:	WQ-TOX-001				
Sample No:	18-5933-9189	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 09:15 AM	Code:	16150-002			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	7h	Station:	WQ-TOX-002				
Sample No:	08-7827-7773	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 09:30 AM	Code:	16150-003			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	7h	Station:	WQ-TOX-003				
Sample No:	04-4490-4090	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 10:05 AM	Code:	16150-004			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	6h	Station:	WQ-TOX-004				
Proportion Fertilized Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	4	0.96872	0.95238	0.98058	0.00704	0.01409	1.45%
16150-001	4	0.97342	0.96154	0.98058	0.00453	0.00906	0.93%
16150-002	4	0.96659	0.95238	0.99020	0.00818	0.01636	1.69%
16150-003	4	0.97806	0.97087	0.98058	0.00240	0.00479	0.49%
16150-004	4	0.94960	0.90090	1.00000	0.02216	0.04432	4.67%
Proportion Fertilized Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
16150-000	0.95238	0.98039	0.96154	0.98058			
16150-001	0.98039	0.96154	0.97115	0.98058			
16150-002	0.96154	0.95238	0.99020	0.96226			
16150-003	0.98039	0.97087	0.98039	0.98058			
16150-004	1.00000	0.92661	0.97087	0.90090			

CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	03-9154-3054	Test Type:	Fertilization	Duration:	80m				
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata				
Ending Date:	09 Aug-07 05:40 PM	Dil Water:	Not Applicable	Source:	In-House Culture				
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable						
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Proportion Fertilized	Comparison	02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026				
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	2.16955	47.46723	0.54107	Equal Variances				
Distribution	Shapiro-Wilk W	0.88468	0.74935	0.20206	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0003040	0.0003040	1	0.25	0.63352	Non-Significant Effect			
Error	0.0072375	0.0012062	6						
Total	0.00754151	0.0015103	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-001	-0.5021	1.94318	0.6832	0.04772	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	0.96872	0.95238	0.98058	0.01409	1.39638	1.35081	1.43099	0.04064
16150-001	4	0.97342	0.96154	0.98058	0.00906	1.40871	1.37340	1.43099	0.02759
Graphics									
									

CETIS Analysis Detail

Arbacia Sperm Cell Fertilization Test

EnviroSystems, Inc.

Test No:	03-9154-3054	Test Type:	Fertilization	Duration:	80m
Start Date:	09 Aug-07 04:20 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata
Ending Date:	09 Aug-07 05:40 PM	Dil Water:	Not Applicable	Source:	In-House Culture
Setup Date:	09 Aug-07 04:20 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.74776	47.46723	0.65783	Equal Variances
Distribution	Shapiro-Wilk W	0.88162	0.74935	0.18999	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	2.587E-05	2.587E-05	1	0.01	0.91844	Non-Significant Effect
Error	0.0136125	0.0022687	6			
Total	0.01363833	0.0022946	7			

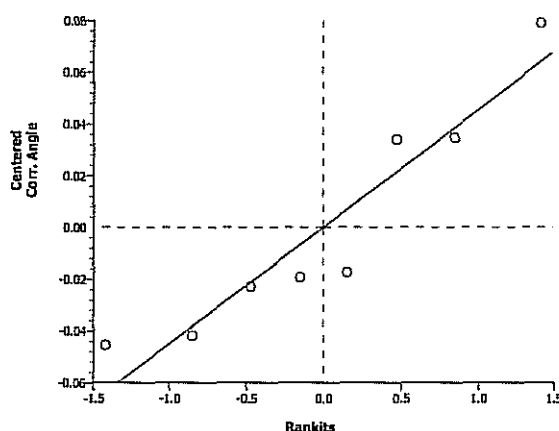
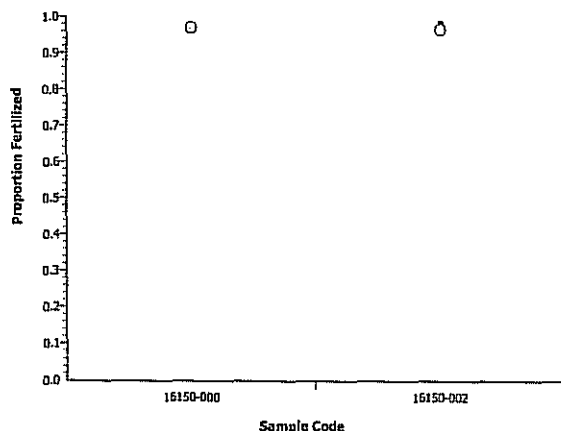
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16150-000		16150-002	0.10679	1.94318	0.4592	0.06545	Non-Significant Effect

Data Summary

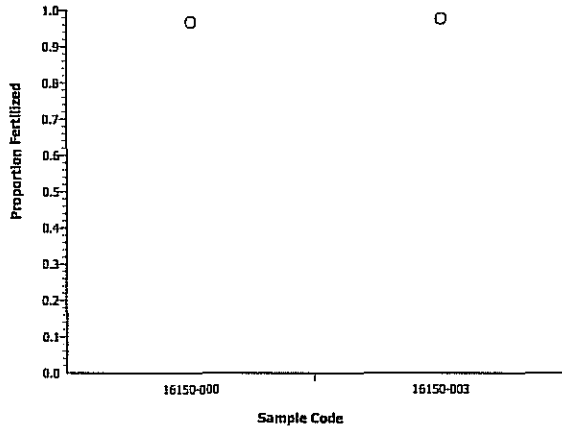
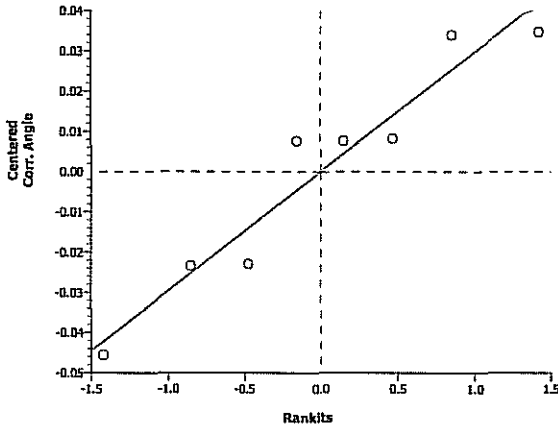
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	0.96872	0.95238	0.98058	0.01409	1.39638	1.35081	1.43099	0.04064
16150-002	4	0.96659	0.95238	0.99020	0.01636	1.39278	1.35081	1.47162	0.05372

Graphics



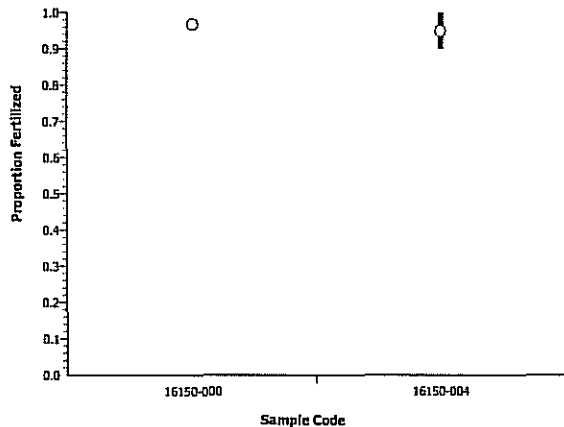
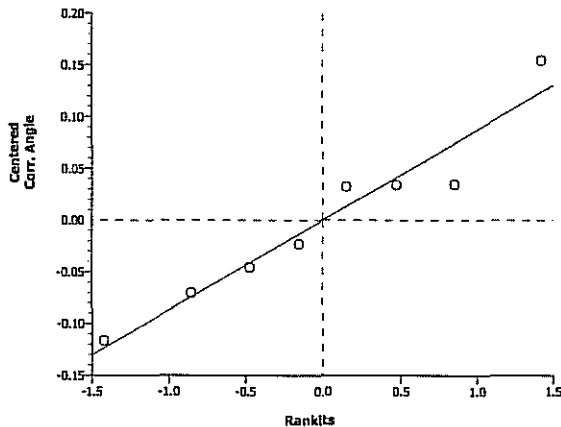
CETIS Analysis Detail

Comparisons: Page 4 of 7
 Report Date: 21 Aug-07 2:00 PM
 Analysis: 08-2590-7150

Arbacia Sperm Cell Fertilization Test					EnviroSystems, Inc.				
Test No:	03-9154-3054		Test Type:	Fertilization		Duration:	80m		
Start Date:	09 Aug-07 04:20 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	09 Aug-07 05:40 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	09 Aug-07 04:20 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	6.76388	47.46723	0.15074	Equal Variances				
Distribution	Shapiro-Wilk W	0.91479	0.74935	0.36413	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0013884	0.0013884	1	1.46	0.27166	Non-Significant Effect			
Error	0.0056864	0.0009477	6						
Total	0.00707484	0.0023361	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-003	-1.2103	1.94318	0.8642	0.04230	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	0.96872	0.95238	0.98058	0.01409	1.39638	1.35081	1.43099	0.04064
16150-003	4	0.97806	0.97087	0.98058	0.00479	1.42273	1.39929	1.43099	0.01562
Graphics									
									

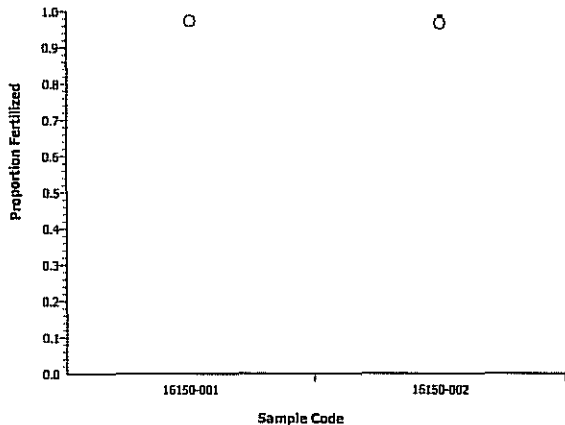
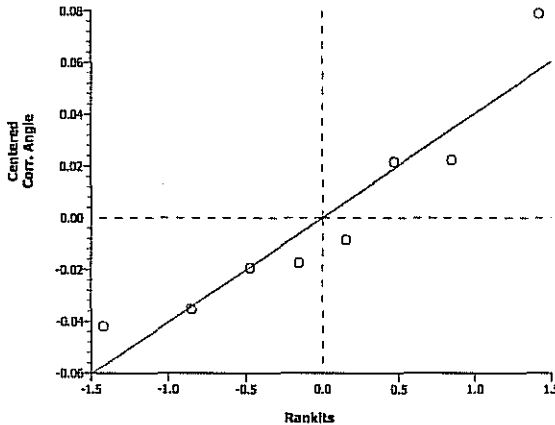
CETIS Analysis Detail

Comparisons: Page 6 of 7
 Report Date: 21 Aug-07 2:00 PM
 Analysis: 10-6892-8809

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	03-9154-3054		Test Type:	Fertilization		Duration:	80m		
Start Date:	09 Aug-07 04:20 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	09 Aug-07 05:40 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	09 Aug-07 04:20 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	8.75630	47.46723	0.10793	Equal Variances				
Distribution	Shapiro-Wilk W	0.94788	0.74935	0.65313	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0017389	0.0017389	1	0.22	0.65859	Non-Significant Effect			
Error	0.0483329	0.0080555	6						
Total	0.05007182	0.0097944	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-004	0.46461	1.94318	0.3293	0.12332	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	0.96872	0.95238	0.98058	0.01409	1.39638	1.35081	1.43099	0.04064
16150-004	4	0.94960	0.90090	1.00000	0.04432	1.36689	1.25055	1.52127	0.12025
Graphics									
									

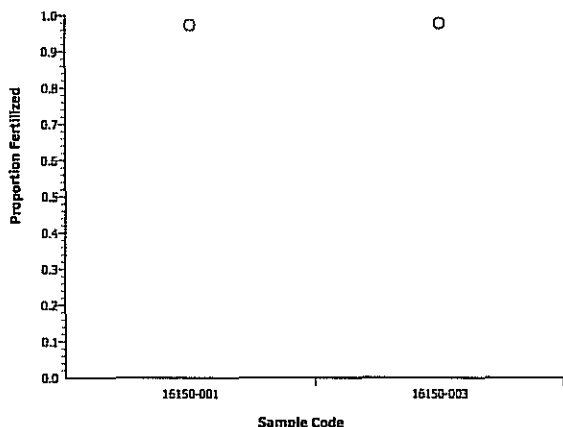
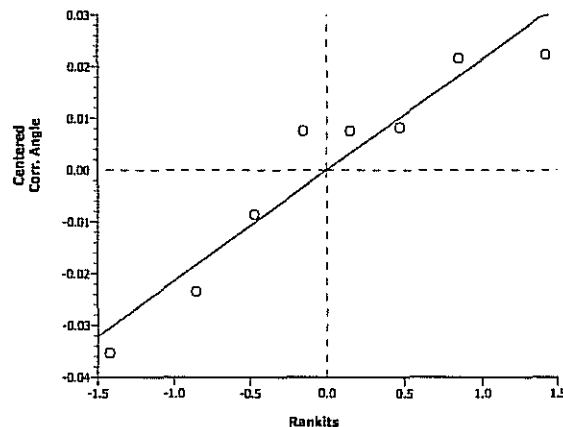
CETIS Analysis Detail

Comparisons: Page 7 of 7
 Report Date: 21 Aug-07 2:00 PM
 Analysis: 13-1479-5850

Arbacia Sperm Cell Fertilization Test					EnviroSystems, Inc.				
Test No:	03-9154-3054		Test Type:	Fertilization		Duration:	80m		
Start Date:	09 Aug-07 04:20 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	09 Aug-07 05:40 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	09 Aug-07 04:20 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	3.79185	47.46723	0.30260	Equal Variances				
Distribution	Shapiro-Wilk W	0.89537	0.74935	0.25002	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0005073	0.0005073	1	0.28	0.61682	Non-Significant Effect			
Error	0.0109419	0.0018236	6						
Total	0.01144916	0.0023309	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-001		16150-002	0.52743	1.94318	0.3084	0.05868	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	4	0.97342	0.96154	0.98058	0.00906	1.40871	1.37340	1.43099	0.02759
16150-002	4	0.96659	0.95238	0.99020	0.01636	1.39278	1.35081	1.47162	0.05372
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 1 of 7
 Report Date: 21 Aug-07 2:00 PM
 Analysis: 04-6560-4440

Arbacia Sperm Cell Fertilization Test					EnviroSystems, Inc.				
Test No:	03-9154-3054		Test Type: Fertilization		Duration: 80m				
Start Date:	09 Aug-07 04:20 PM		Protocol: EPA/821/R-02-014 (2002)		Species: Arbacia punctulata				
Ending Date:	09 Aug-07 05:40 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	09 Aug-07 04:20 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Proportion Fertilized		Comparison		02-1118-1875	02-1118-1875	13 Aug-07 3:10 PM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Angular (Corrected)		N/A				
ANOVA Assumptions									
Attribute	Test	Statistic		Critical	P Level	Decision(0.01)			
Variances	Variance Ratio	3.11764		47.46723	0.37533	Equal Variances			
Distribution	Shapiro-Wilk W	0.89800		0.74935	0.26335	Normal Distribution			
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.000393	0.000393	1	0.78	0.41060	Non-Significant Effect			
Error	0.0030159	0.0005026	6						
Total	0.00340885	0.0008956	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-001		16150-003	-0.8842	1.94318	0.7947	0.03081	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	4	0.97342	0.96154	0.98058	0.00906	1.40871	1.37340	1.43099	0.02759
16150-003	4	0.97806	0.97087	0.98058	0.00479	1.42273	1.39929	1.43099	0.01562
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 5 of 7
 Report Date: 21 Aug-07 2:00 PM
 Analysis: 10-3611-9046

Arbacia Sperm Cell Fertilization Test					EnviroSystems, Inc.				
Test No:	03-9154-3054		Test Type:	Fertilization		Duration:	80m		
Start Date:	09 Aug-07 04:20 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	09 Aug-07 05:40 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	09 Aug-07 04:20 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		02-1118-1875	02-1118-1875	13 Aug-07 3:11 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	18.99722	47.46723	0.03739	Equal Variances				
Distribution	Shapiro-Wilk W	0.94847	0.74935	0.65926	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0034972	0.0034972	1	0.46	0.52311	Non-Significant Effect			
Error	0.0456624	0.0076104	6						
Total	0.04915951	0.0111076	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-001		16150-004	0.67788	1.94318	0.2616	0.11987	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	4	0.97342	0.96154	0.98058	0.00906	1.40871	1.37340	1.43099	0.02759
16150-004	4	0.94960	0.90090	1.00000	0.04432	1.36689	1.25055	1.52127	0.12025
Graphics									

Sample Identification	16150-001 16150-002 16150-003 16150-004	Analyst	Mary Moody	SRC#	E 556, 557, 558, 559
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E	556 to 559									
Date	Aug 14/07									
			Cystocarps per branch				Mean	SD	Group mean and SD	Comments
Control	NSW	41	37	42	51	41	42.4	5.2	38.6	Healthy red colour
		29	19	32	24	44	29.6	9.4	11.8	Normal growth
		41	52	63	27	33	43.2	14.5		
		61	42	30	26	36	39.0	13.7		
	16150-001	46	39	49	24	41	39.8	9.7	34.2	Healthy red colour
		21	26	30	21	39	27.4	7.5	10.5	Normal growth
		21	39	22	29	22	26.6	7.6		
		40	51	40	49	34	42.8	7.0		
	16150-002	110 cystocarps on all 5 branches					22.0	nc	19.5	Branches white with red tips.
		68 cystocarps on all 5 branches					13.6	nc	nc	Branches fragmented.
		90 cystocarps on all 5 branches					18.0	nc		
		122 cystocarps on all 5 branches					24.4	nc		
	16150-003	50	39	54	46	44	46.6	5.7	40.4	Branches white with red tips.
		37	30	33	41	28	33.8	5.3	8.3	
		54	43	40	45	45	45.4	5.2		
		24	30	46	39	39	35.6	8.6		
	16150-004	26	25	20	31	32	26.8	4.9	24.4	Branches white with red tips.
		6	13	10	8	15	10.4	3.6	10.8	
		28	35	41	44	33	36.2	6.4		
		24	22	20	18	36	24.0	7.1		

SD:
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nc: not calculable

Submitted by: _____ Date: _____

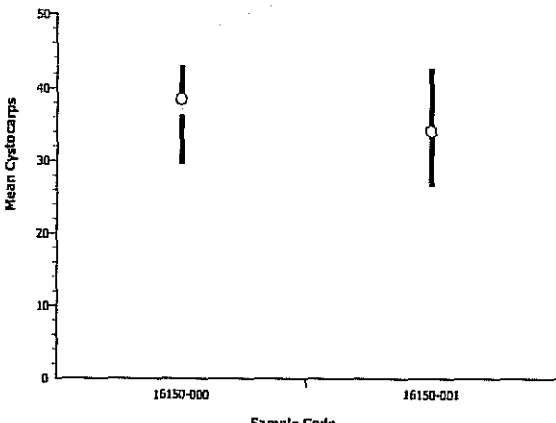
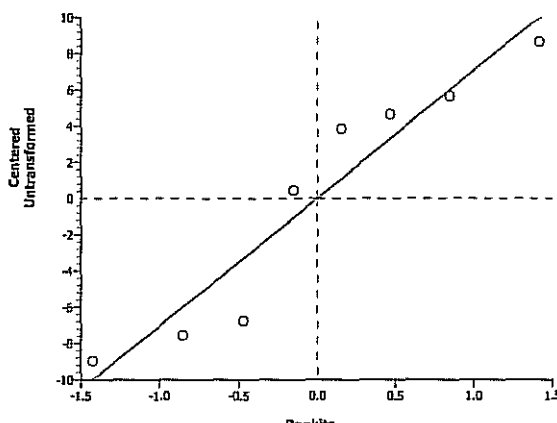
CETIS Test Summary

Report Date: 21 Aug-07 3:55 PM

Link: 06-9683-0298

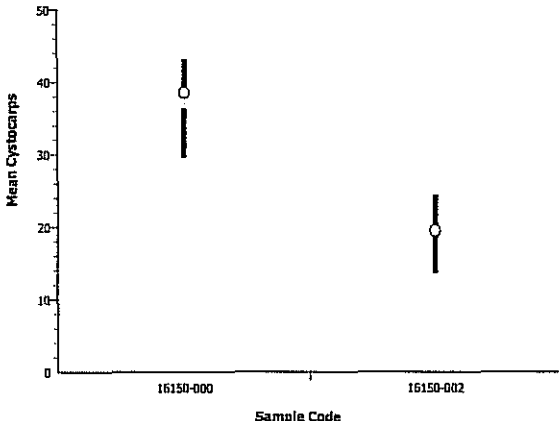
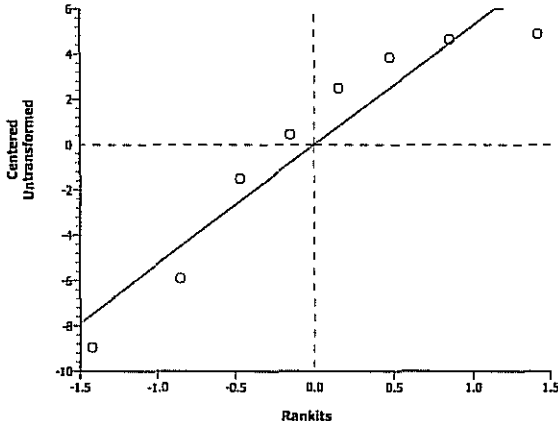
Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council	
Test No:	04-7828-8134	Test Type:	Champia			Duration:	7d 0h
Start Date:	13 Aug-07 12:00 PM	Protocol:	EPA/600/4-91/003 (1994)			Species:	Champia parvula
Ending Date:	20 Aug-07 12:00 PM	Dil Water:	Not Applicable			Source:	In-House Culture
Setup Date:	13 Aug-07 12:00 PM	Brine:	Not Applicable				
Sample No:	06-6444-1965	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 04:00 PM	Code:	16150-000			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	92h	Station:	Laboratory Water Control				
Sample No:	14-0079-4493	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 08:40 AM	Code:	16150-001			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 3h	Station:	WQ-TOX-001				
Sample No:	18-5933-9189	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 09:15 AM	Code:	16150-002			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 2h	Station:	WQ-TOX-002				
Sample No:	08-7827-7773	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 09:30 AM	Code:	16150-003			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 2h	Station:	WQ-TOX-003				
Sample No:	04-4490-4090	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	09 Aug-07 10:05 AM	Code:	16150-004			Project:	Ecological Risk Assessment
Receive Date:	09 Aug-07 02:55 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 1h	Station:	WQ-TOX-004				
Mean Cystocarps Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16150-000	4	38.55	29.6	43.2	3.11916	6.23832	16.18%
16150-001	4	34.15	26.6	42.8	4.17642	8.35284	24.46%
16150-002	4	19.5	13.6	24.4	2.36854	4.73709	24.29%
16150-003	4	40.35	33.8	46.6	3.29178	6.58357	16.32%
16150-004	4	24.35	10.4	36.2	5.33190	10.6638	43.79%
Mean Cystocarps Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
16150-000	42.4	29.6	43.2	39			
16150-001	39.8	27.4	26.6	42.8			
16150-002	22	13.6	18	24.4			
16150-003	46.6	33.8	45.4	35.6			
16150-004	26.8	10.4	36.2	24			

CETIS Analysis Detail

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	04-7828-8134		Test Type:	Champia		Duration:	7d 0h		
Start Date:	13 Aug-07 12:00 PM		Protocol:	EPA/600/4-91/003 (1994)		Species:	Champia parvula		
Ending Date:	20 Aug-07 12:00 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	13 Aug-07 12:00 PM		Brine:	Not Applicable					
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		06-9683-0298	06-9683-0298	21 Aug-07 3:54 PM	CETISv1.026		
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic		Critical	P Level	Decision(0.01)			
Variances	Variance Ratio	1.79281		47.46723	0.64348	Equal Variances			
Distribution	Shapiro-Wilk W	0.88694		0.74935	0.21144	Normal Distribution			
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	38.72	38.72	1	0.71	0.43098	Non-Significant Effect			
Error	326.06	54.34333	6						
Total	364.779999	93.063335	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-001	0.84410	1.94318	0.2155	10.1291	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	38.5500	29.6	43.2	6.23832				
16150-001	4	34.15	26.6	42.8	8.35284				
Graphics									
									

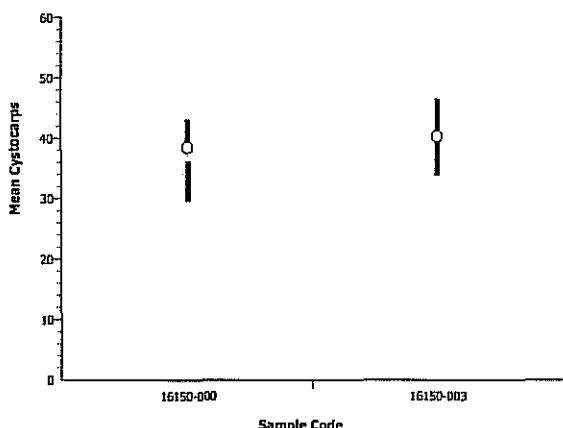
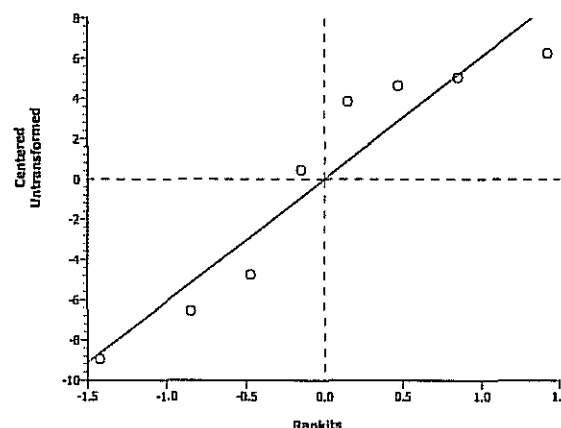
CETIS Analysis Detail

Comparisons: Page 4 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 10-7116-6050

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council			
Test No:	04-7828-8134		Test Type:	Champia		Duration:	7d 0h		
Start Date:	13 Aug-07 12:00 PM		Protocol:	EPA/600/4-91/003 (1994)		Species:	Champia parvula		
Ending Date:	20 Aug-07 12:00 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	13 Aug-07 12:00 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Mean Cystocarps	Comparison		06-9683-0298	06-9683-0298	21 Aug-07 3:54 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.73425	47.46723	0.66224	Equal Variances				
Distribution	Shapiro-Wilk W	0.88559	0.74935	0.20579	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	725.805	725.805	1	23.66	0.00281	Significant Effect			
Error	184.07	30.67833	6						
Total	909.875	756.48333	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-002	4.86401	1.94318	0.0014	7.61051	Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	38.5500	29.6	43.2	6.23832				
16150-002	4	19.5	13.6	24.4	4.73709				
Graphics									
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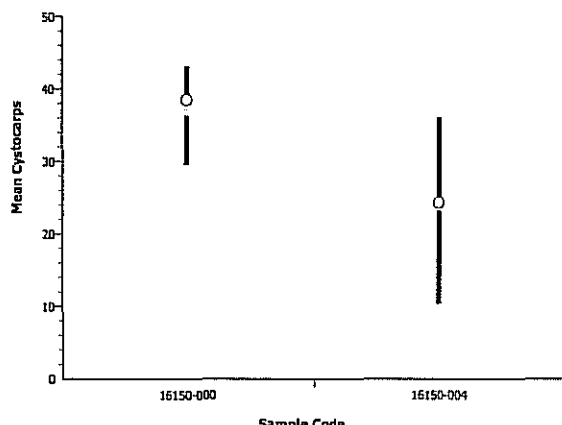
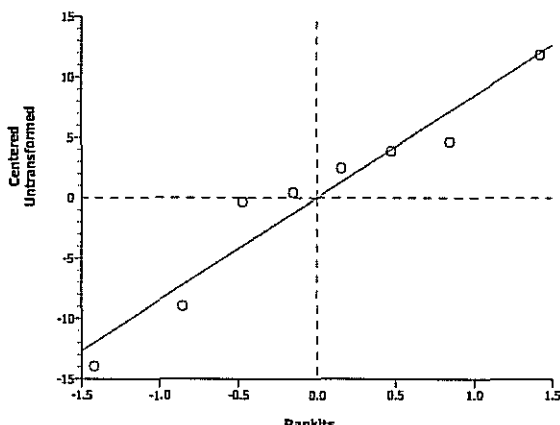
CETIS Analysis Detail

Comparisons: Page 2 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 05-8701-8857

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council					
Test No:	04-7828-8134		Test Type:		Champia		Duration:		7d 0h		
Start Date:	13 Aug-07 12:00 PM		Protocol:		EPA/600/4-91/003 (1994)		Species:		Champia parvula		
Ending Date:	20 Aug-07 12:00 PM		Dil Water:		Not Applicable		Source:		In-House Culture		
Setup Date:	13 Aug-07 12:00 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
Mean Cystocarps		Comparison		06-9683-0298		06-9683-0298		21 Aug-07 3:54 PM		CETISv1.026	
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units		ChV	MSDp
Equal Variance t		C > T	Untransformed					N/A			
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		1.11375		47.46723		0.93152		Equal Variances	
Distribution		Shapiro-Wilk W		0.87545		0.74935		0.16764		Normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		6.48		6.48		1		0.16		0.70516	
Error		246.78		41.13		6					
Total		253.259999		47.610001		7					
Group Comparisons											
Sample		vs	Sample		Statistic		Critical		P Level		MSD
16150-000			16150-003		-0.3969		1.94318		0.6474		8.81206
											Decision(0.05)
											Non-Significant Effect
Data Summary											
Sample Code		Count	Original Data				Transformed Data				
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD	
16150-000		4	38.5500	29.6	43.2	6.23832					
16150-003		4	40.35	33.8	46.6	6.58356					
Graphics											
											

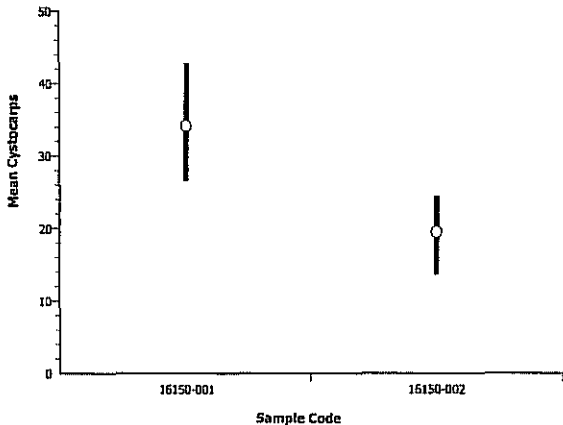
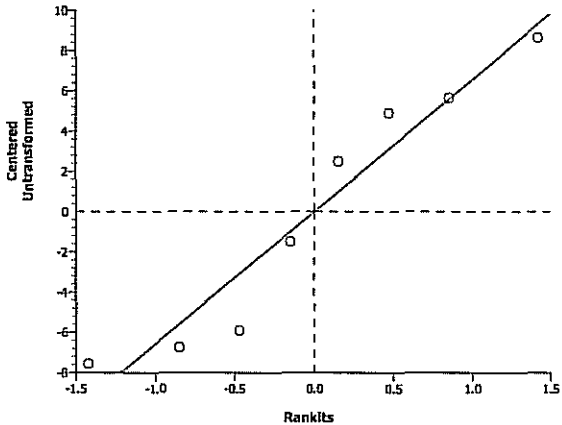
CETIS Analysis Detail

Comparisons: Page 1 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 05-6330-3008

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	04-7828-8134		Test Type:	Champia		Duration:	7d 0h		
Start Date:	13 Aug-07 12:00 PM		Protocol:	EPA/600/4-91/003 (1994)		Species:	Champia parvula		
Ending Date:	20 Aug-07 12:00 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	13 Aug-07 12:00 PM		Brine:	Not Applicable					
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed		Version	
Mean Cystocarps		Comparison		06-9683-0298	06-9683-0298	21 Aug-07 3:55 PM		CETISv1.026	
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Untransformed		N/A				
ANOVA Assumptions									
Attribute	Test	Statistic		Critical	P Level	Decision(0.01)			
Variances	Variance Ratio	2.92206		47.46723	0.40199	Equal Variances			
Distribution	Shapiro-Wilk W	0.94134		0.74935	0.58692	Normal Distribution			
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	403.28	403.28	1	5.28	0.06120	Non-Significant Effect			
Error	457.9	76.31667	6						
Total	861.179993	479.59666	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16150-000		16150-004	2.29876	1.94318	0.0306	12.0035	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-000	4	38.5500	29.6	43.2	6.23832				
16150-004	4	24.35	10.4	36.2	10.6638				
Graphics									
									

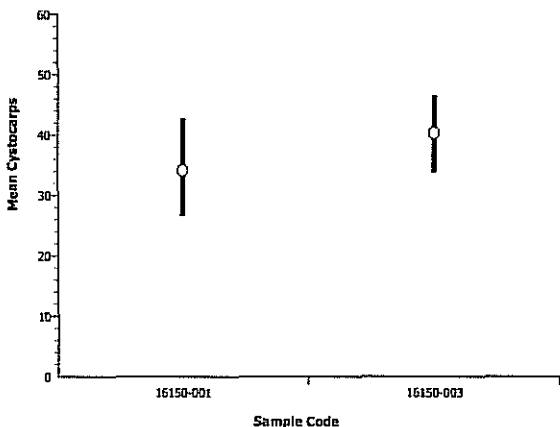
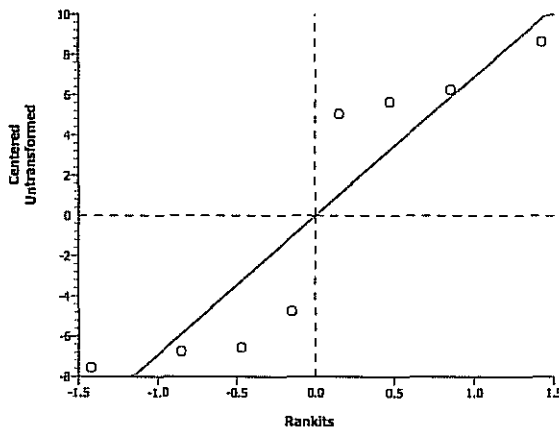
CETIS Analysis Detail

Comparisons: Page 3 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 06-0868-6784

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council					
Test No:	04-7828-8134		Test Type: Champia		Duration: 7d 0h					
Start Date:	13 Aug-07 12:00 PM		Protocol: EPA/600/4-91/003 (1994)		Species: Champia parvula					
Ending Date:	20 Aug-07 12:00 PM		Dil Water: Not Applicable		Source: In-House Culture					
Setup Date:	13 Aug-07 12:00 PM		Brine: Not Applicable							
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Mean Cystocarps		Comparison		06-9683-0298	06-9683-0298	21 Aug-07 3:55 PM	CETISv1.026			
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t		C > T	Untransformed		N/A					
ANOVA Assumptions										
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)				
Variances		Variance Ratio	3.10918	47.46723	0.37642	Equal Variances				
Distribution		Shapiro-Wilk W	0.90637	0.74935	0.30999	Normal Distribution				
ANOVA Table										
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between		429.245	429.245	1	9.31	0.02248	Significant Effect			
Error		276.63	46.105	6						
Total		705.875	475.34999	7						
Group Comparisons										
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)			
16150-001		16150-002	3.05126	1.94318	0.0112	9.3298	Significant Effect			
Data Summary										
		Original Data				Transformed Data				
Sample Code		Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001		4	34.15	26.6	42.8	8.35284				
16150-002		4	19.5	13.6	24.4	4.73709				
Graphics										
										

CETIS Analysis Detail

Comparisons: Page 6 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 11-6036-9162

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council						
Test No:	04-7828-8134		Test Type:		Champia		Duration:		7d 0h			
Start Date:	13 Aug-07 12:00 PM		Protocol:		EPA/600/4-91/003 (1994)		Species:		Champia parvula			
Ending Date:	20 Aug-07 12:00 PM		Dil Water:		Not Applicable		Source:		In-House Culture			
Setup Date:	13 Aug-07 12:00 PM		Brine:		Not Applicable							
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version		
Mean Cystocarps		Comparison		06-9683-0298		06-9683-0298		21 Aug-07 3:55 PM		CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp			
Equal Variance t		C > T	Untransformed		N/A							
ANOVA Assumptions												
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)		
Variances		Variance Ratio		1.60971		47.46723		0.70526		Equal Variances		
Distribution		Shapiro-Wilk W		0.81143		0.74935		0.04292		Normal Distribution		
ANOVA Table												
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		
Between		76.88		76.88		1		1.36		0.28790		
Error		339.34		56.55667		6						
Total		416.21994		133.43666		7						
Group Comparisons												
Sample		vs	Sample		Statistic		Critical		P Level		MSD	
16150-001			16150-003		-1.1659		1.94318		0.8561		10.3333	
											Decision(0.05)	
											Non-Significant Effect	
Data Summary												
Sample Code		Count	Original Data				Transformed Data					
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD		
16150-001		4	34.15	26.6	42.8	8.35284						
16150-003		4	40.35	33.8	46.6	6.58356						
Graphics												
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CETIS Analysis Detail

Comparisons: Page 7 of 7
 Report Date: 21 Aug-07 3:56 PM
 Analysis: 14-7313-1797

Champia parvula Red Macroalga Sexual Reproduction Test

Saskatchewan Research Council

Test No: 04-7828-8134	Test Type: Champia	Duration: 7d 0h
Start Date: 13 Aug-07 12:00 PM	Protocol: EPA/600/4-91/003 (1994)	Species: Champia parvula
Ending Date: 20 Aug-07 12:00 PM	Dil Water: Not Applicable	Source: In-House Culture
Setup Date: 13 Aug-07 12:00 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	06-9683-0298	06-9683-0298	21 Aug-07 3:55 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.62988	47.46723	0.69799	Equal Variances
Distribution	Shapiro-Wilk W	0.96589	0.74935	0.84219	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	192.08	192.08	1	2.09	0.19806	Non-Significant Effect
Error	550.46	91.74333	6			
Total	742.540024	283.82333	7			

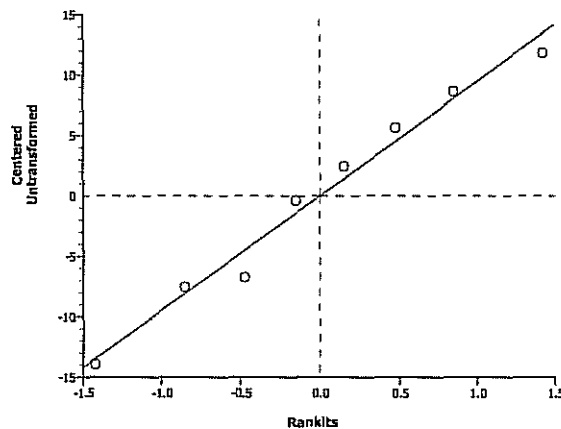
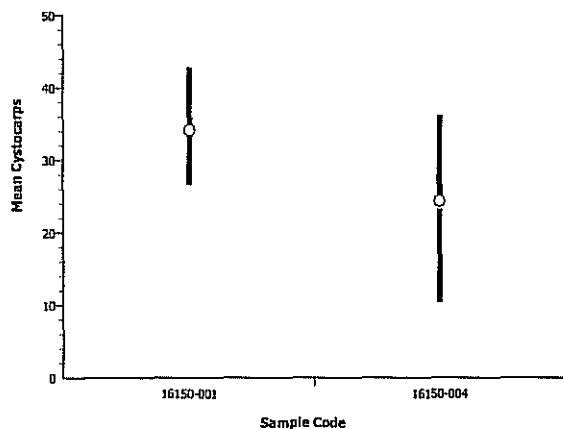
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16150-001		16150-004	1.44695	1.94318	0.0990	13.1609	Non-Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16150-001	4	34.15	26.6	42.8	8.35284				
16150-004	4	24.35	10.4	36.2	10.6638				

Graphics



SALTWATER ASSAYS

A. bahia, *A. punctulata*, *C. parvula*

STUDY:	LOCATION: New Bedford Harbor				
CHEMISTRY					
	Lab Salt Control	-001	-002	-003	-004
AMMONIA	-007	-005	-006	-007	-008
AS RECEIVED WATER QUALITIES					
	Lab Salt Control	-001	-002	-003	-004
SALINITY (ppt)	30	30	30	30	30
pH (SU)	7.95	7.36	7.26	7.38	7.39
TRC (mg/L)	20.05	20.05	20.05	20.05	20.05
DO (mg/L)	6.8	6.8	6.6	7.2	5.8
S/C (µmhos/cm)	44630	44630	45100	45260	44960
WQ STATION USED	1				
INITIALS	SJ				
<i>A. bahia</i> SALINITY ADJUSTMENT RECORD					
	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)					
SEA SALT (g)					
DATE:					
TIME:					
INITIALS:					

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

**Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES**

STUDY: 116150		CLIENT: BATTELLE				LOCATION: NEW BEDFORD				LAB CONTROL: HAMPTON ESTUARY					
		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	6.8	6.6	6.4	6.9	6.8	6.8	6.4	30 29.5	29	30	29	30	29	29
-001	A	6.3	6.3	6.4	6.6	6.7	7.2	6.5	30 29.5	29	30	29	29	29	29
-002	A	6.6	6.7	6.6	6.7	6.5	7.1	6.7	30 29.5	29	30	29	29	28	29
-003	A	7.2	6.8	6.7	6.8	6.6	6.8	7.0	30 29.5	29	29	29	30	29	29
-004	A	5.8	6.0	6.0	5.9	6.5	7.1	7.0	30 29.5	29	29	29	30	29	29
NEW pH (SU)									NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.95	7.85	7.89	7.72	7.75	7.86	7.71	25	25	25	25	25	25	25
-001	A	7.36	7.20	7.36	7.30	7.19	7.14	7.10	25	25	25	25	25	25	25
-002	A	7.26	7.06	7.24	7.23	7.16	7.19	6.94	25	25	25	25	25	25	25
-003	A	7.38	7.14	7.31	7.30	7.25	7.33	7.11	25	25	25	25	25	25	25
-004	A	7.39	7.19	7.28	7.31	7.28	7.38	7.21	25	25	25	25	25	25	25
INC TEMP:		25	26	26	26	26	26	26							
DATE:		8/9/07	8/10	8/11	8/12	8/13	8/14	8/15							
TIME:		1600	0910	1410	1010	1125	1040	1555							
INIT:		SJ	RAM	CS	SJ	SJ	RAM	SW							

**WATER QUALITY METERS USED
NEW WATER QUALITIES**

	0	1	2	3	4	5	6	7
Water Quality Station #		2	1	1	1	1	1	
Initials		RAM	CS	SJ	SJ	RAM	SW	
Date	8/9/07	8/10	8/11	8/12	8/13	8/14	8/15	

**Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES**

STUDY:		CLIENT:		LOCATION:					LAB CONTROL:						
110150		BATTELLE		NEW BEDFORD					HAMPTON ESTUARY						
OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	29	29	29	29	28	29	30	7.85	7.69	7.85	7.81	7.98	7.61	7.97
-001	A	29	29	29	30	30	30	30	7.68	7.80	7.73	7.78	7.85	7.50	7.93
-002	A	29	29	29	30	30	30	30	7.70	7.72	7.75	7.80	7.81	7.44	7.91
-003	A	29	29	29	30	30	30	30	7.67	7.71	7.74	7.82	7.88	7.71	7.97
-004	A	29	29	29	30	30	30	30	7.81	7.80	7.76	7.80	7.88	7.61	7.98
OLD TEMPERATURE (°C)															
Conc	Rep	1	2	3	4	5	6	7							
Control	A	25	25	25	25	25	25	25							
-001	A	25	25	25	25	25	25	25							
-002	A	25	25	25	25	25	25	25							
-003	A	25	25	25	25	25	25	25							
-004	A	25	25	25	25	25	25	25							
INC TEMP:		26	26	26	26	26	26	26							
DATE:		8/10/07	8/11	8/12	8/13	8/14	8/15	8/16							
TIME:		0815	1355	0840	1035	0840	1515	1030							
INITIALS:		RAM	CS	SJ	SJ	RAM	PL	SJ							

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each
- Test Temperature: 26±1°C
- Salinity: 25 ±2ppt
- Dissolved Oxygen: >4.3 mg/L
- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		2	1	1	1	1	1	1
Initials		RAM	CS	SJ	SJ	RAM	SJ	SJ
Date	8/9/07	8/10/07	8/11/07	8/12	8/13	8/14	8/15	8/16

**Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data**

STUDY: <u>16150</u>	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: <u>8/9/07</u> INITIALS: <u>BIB</u>		
SALINITY ADJUSTMENT RECORD: _____ mL -001 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -002 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -003 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -004 + _____ g SALT					

SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	<u>6.8</u>	<u>7.95</u>	<u>44630</u>	<u>22</u>	<u>29</u>
-001	<u>6.3</u>	<u>7.36</u>	<u>454910</u>	<u>22</u>	<u>29</u>
-002	<u>6.6</u>	<u>7.26</u>	<u>45100</u>	<u>22</u>	<u>29</u>
-003	<u>7.2</u>	<u>7.38</u>	<u>45260</u>	<u>22</u>	<u>29</u>
-004	<u>5.8</u>	<u>7.39</u>	<u>44960</u>	<u>22</u>	<u>29</u>

METERS USED

DO meter # 19 DO probe # 12 pH meter # 1007 pH probe # 50 S/C meter # YS30C S/C probe # YS30C
 SALINITY meter # YS30C

DATE & INITIALS FOR GAMETE PREPARATION: BIB 8/9/07
 SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 125 $\times 10^4$ = SPM SOLUTION E = 1.25×10^6
 SPERM CONCENTRATIONS:
 SOLUTION E X 40 = SOLUTION A = 5.0×10^7 SPM
 SOLUTION E X 20 = SOLUTION B = 2.5×10^7 SPM
 SOLUTION E X 5 = SOLUTION C = 6.25×10^6 SPM

FINAL COUNTS:

FINAL SPERM COUNT: 5.8×10^7
 FINAL EGG COUNT: 2800

TEST TIMES:

SPERM COLLECTED: 1600
 EGGS COLLECTED: 1600
 SPERM ADDED: 1620
 EGGS ADDED: 1720
 FIXATIVE ADDED: 1740

**Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD**

STUDY: 10150			CLIENT: BATTELLE - New Bedford							
SPECIES: <i>A. bahia</i>			TEST: chronic renewal							
Sample	Day: 0		Day: 1		Day: 2		Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	1200	n/a	1000	n/a	1000	n/a	0	8/9/07	1555	SJ
-001		-001		-001		-001	1	8/10	0855	RAM
-002		-002		-002		-002	2	8/11	1410	CS
-003		-003		-003		-003	3	8/12	1005	SJ
-004	↓	-004	↓	-004	✓	-004	4	8/13	1115	SJ
							5	8/14	1015	RAM
							6	8/15	1545	SJ
Sample	Day: 3		Day: 4		Day: 5		Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	1000	n/a	1000	n/a	1000	n/a				
-001		-001		-001		-001				
-002		-002		-002		-002				
-003		-003		-003		-003				
-004	↓	-004	↓	-004	↓	-004				
Sample	Day: 6						Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID								
Lab Control	1000	n/a								
-001		-001								
-002		-002								
-003		-003								
-004	↑	-004								

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY:		CLIENT:				LOCATION:				LAB CONTROL:				ORGANISM			
16234		Battelle				NEW BEDFORD				HAMPTON ESTUARY				BATCH/LOT#			
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4*	5	6	7	1	2	3	4	5	6	7	
Lab Control	A	10	10	10	10	10	10	10	10	6.6	6.0	5.3	5.8	5.7	5.2	5.8	
	B	10	10	10	10	10	10	10	10	6.4	6.0	5.0	5.4	5.6	4.9	5.9	
	C	10	10	10	10	10	10	10	10	6.5	5.9	5.1	5.3	5.3	5.1	5.9	
	D	10	10	10	10	10	10	10	10	6.7	5.9	5.2	5.4	5.1	5.2	5.8	
	E	10	10	10	10	10	10	10	10	6.6	6.0	5.5	5.4	4.9	5.1	5.8	
	F	10	10	10	10	10	10	10	10	6.5	6.0	5.4	5.4	4.9	5.0	5.8	
	G	10	10	10	10	10	10	10	10	6.6	6.0	5.5	5.6	5.0	5.0	5.7	
	H	10	10	10	10	10	10	10	10	6.8	6.0	5.6	5.6	5.1	5.1	5.7	
-001	A	10	10	10	10	10	10	10	10	6.4	4.9	4.3	5.1	5.1	5.0	5.2	
	B	10	10	10	10	10	10	10	10	5.8	4.5	4.6	5.2	4.9	4.8	5.2	
	C	10	10	10	10	10	10	10	10	5.7	4.7	5.0	5.1	4.9	4.6	5.2	
	D	10	10	10	10	10	10	10	10	6.1	4.7	5.1	5.4	4.8	4.6	5.3	
	E	10	10	9	9	9	9	9	9	6.2	4.7	5.1	5.3	4.6	4.7	5.4	
	F	10	10	10	10	10	10	10	10	5.8	4.5	5.0	5.1	4.7	4.9	5.4	
	G	10	10	10	10	10	10	10	10	5.9	4.5	5.0	5.1	4.6	4.8	5.3	
	H	10	10	10	10	10	10	10	10	6.2	4.6	4.9	4.8	4.7	4.8	5.3	
-002	A	10	10	10	10	10	10	10	10	6.4	5.5	4.9	5.0	4.9	4.9	5.3	
	B	10	10	10	10	10	10	10	10	6.7	5.6	4.7	5.1	4.9	4.9	5.3	
	C	10	10	10	10	10	10	10	10	6.8	5.5	5.2	5.3	5.1	4.7	5.3	
	D	10	10	10	10	10	10	10	10	6.8	5.5	5.0	5.1	5.1	4.6	5.3	
	E	10	10	10	10	10	10	10	10	7.0	5.4	5.3	5.1	5.3	4.9	5.5	
	F	10	10	10	10	9	9	9	9	7.1	6.4	5.3	5.2	5.4	5.1	5.5	
	G	10	10	10	10	10	10	10	10	7.0	5.4	5.1	5.1	5.4	5.1	5.5	
	H	10	10	10	10	10	10	10	10	7.0	5.5	5.1	5.1	5.3	4.9	5.5	
INC TEMP:		25	26	26	26	26	26	26	26								
DATE:		9/12	9/13	9/14	9/15	9/16	9/17	9/18	9/19								
TIME:		1540	1545	1010	1230	0950	1145	1010	0850								
INITIALS:		AK	PA	UB	RAM	SJ	SS	SJ	RAM								

*CAR #2

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY: 16234		CLIENT: Battelle		LOCATION: NEW BEDFORD		LAB CONTROL: HAMPTON ESTUARY		ORGANISM BATCH/LOT#									
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
-003	A	10	10	10	10	10	8	7	7	6.6	5.1	5.0	5.1	5.2	4.9	5.6	
	B	10	10	10	10	10	9	8	4	6.7	5.2	5.1	5.6	5.2	4.9	5.6	
	C	10	10	10	10	10	10	9	4	6.9	5.4	5.2	5.4	5.2	4.9	5.5	
	D	10	10	10	10	10	10	8	7	6.9	5.4	5.2	5.9	5.3	4.7	5.3	
	E	10	10	10	10	10	10	8	4	6.4	5.5	5.1	5.4	5.4	4.6	5.3	
	F	10	10	10	10	9	9	7	3	6.8	5.4	5.1	5.4	5.4	4.6	5.2	
	G	10	10	10	10	10	10	8	4	6.7	5.2	5.2	5.3	5.4	4.8	5.2	
	H	10	10	10	10	10	10	8	3	6.8	5.4	5.3	5.2	5.4	4.6	5.3	
-004	A																
	B																
	C																
	D																
	E																
	F																
	G																
	H																
INC TEMP:	25	26	26	26	26	26	26	26									
DATE:	9/12	9/13	9/14	9/15	9/16	9/17	9/18	9/19									
TIME:	1515	1545	1055	1230	0950	1145	1010	0850									
INITIALS:	AK	AM	LB	RAM	SJ	SJ	SJ	RAM									

**Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS**

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 16234				SPECIES: <i>A. bahia</i>				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
Lab	A	0.21012	0.21291					
	B	0.20835	0.21104					
	C	0.20875	0.21158					
	D	0.20840	0.21132					
	E	0.20753	0.21046					
	F	0.21050	0.21321					
	G	0.20882	0.21131					
	H	0.20888	0.21177					
-001	A	0.20844	0.21170					
	B	0.20762	0.21071					
	C	0.20778	0.21096					
	D	0.20903	0.21259					
	E	0.20995	0.21286					
	F	0.21090	0.21425					
	G	0.20880	0.21217					
	H	0.20933	0.21240					
-002	A	0.20657	0.20965					
	B	0.20814	0.21103					
	C	0.20774	0.21086					
	D	0.21034	0.21309					
	E	0.20828	0.21069					
	F	0.20845	0.21096					
	G	0.20977	0.21270					
	H	0.20856	0.21150					
DATE		9/19/07	9/20/07					
TIME		0930	0935					
INITIALS		RAM	SJ					

Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 16234				SPECIES: <i>A. bahia</i>				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	0.20904	0.21024					
	B	0.20981	0.21072					
	C	0.20977	0.21050					
	D	0.20789	0.20939					
	E	0.20772	0.20852					
	F	0.20872	0.20912					
	G	0.20830	0.20923					
	H	0.20766	0.20837					
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE		9/19/07	9/20/07					
TIME		0930	0935					
INITIALS		RAM	SJ					

CETIS Test Summary

Report Date: 20 Sep-07 10:36 AM

Link: 03-1251-8257

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No:	02-9890-7741	Test Type:	Growth-Survival-Fec (7d)	Duration:	6d 18h
Start Date:	12 Sep-07 03:40 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Mysidopsis bahia
Ending Date:	19 Sep-07 09:50 AM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	12 Sep-07 03:40 PM	Brine:	Not Applicable		

Sample No:	07-3947-2649	Material:	Surface Water	Client:	Battelle Labs
Sample Date:	12 Sep-07 03:00 PM	Code:	16234-000	Project:	Ecological Risk Assessment
Receive Date:	12 Sep-07 03:00 PM	Source:	New Bedford Harbor Dredge Monitorin		
Sample Age:	40m	Station:	WQ-TOX-Lab Control		

Sample No:	10-1282-1229	Material:	Surface Water	Client:	Battelle Labs
Sample Date:	11 Sep-07 09:01 AM	Code:	16234-001	Project:	Ecological Risk Assessment
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin		
Sample Age:	31h	Station:	WQ-TOX-001		

Sample No:	06-2367-6386	Material:	Surface Water	Client:	Battelle Labs
Sample Date:	11 Sep-07 09:45 AM	Code:	16234-002	Project:	Ecological Risk Assessment
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin		
Sample Age:	30h	Station:	WQ-TOX-002		

Sample No:	12-6128-6246	Material:	Surface Water	Client:	Battelle Labs
Sample Date:	11 Sep-07 10:15 AM	Code:	16234-003	Project:	Ecological Risk Assessment
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin		
Sample Age:	29h	Station:	WQ-TOX-003		

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16234-000	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
16234-001	8	0.98750	0.90000	1.00000	0.01250	0.03536	3.58%
16234-002	8	0.98750	0.90000	1.00000	0.01250	0.03536	3.58%
16234-003	8	0.45000	0.30000	0.70000	0.05669	0.16036	35.63%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16234-000	8	0.27813	0.24900	0.29300	0.00524	0.01483	5.33%
16234-001	8	0.32238	0.29100	0.35600	0.00724	0.02048	6.35%
16234-002	8	0.28287	0.24100	0.31200	0.00904	0.02556	9.04%
16234-003	8	0.08975	0.04000	0.15000	0.01177	0.03329	37.10%

Mean Dry Weight-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16234-000	8	0.27813	0.24900	0.29300	0.00524	0.01483	5.33%
16234-001	8	0.32642	0.30700	0.35600	0.00570	0.01613	4.94%
16234-002	8	0.28636	0.24100	0.31200	0.00788	0.02229	7.78%
16234-003	8	0.19978	0.13333	0.23666	0.01263	0.03571	17.88%

CETIS Test Summary

Report Date: 20 Sep-07 10:36 AM

Link: 03-1251-8257

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16234-000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16234-001	1.00000	1.00000	1.00000	1.00000	0.90000	1.00000	1.00000	1.00000
16234-002	1.00000	1.00000	1.00000	1.00000	1.00000	0.90000	1.00000	1.00000
16234-003	0.70000	0.40000	0.40000	0.70000	0.40000	0.30000	0.40000	0.30000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16234-000	0.27900	0.26900	0.28300	0.29200	0.29300	0.27100	0.24900	0.28900
16234-001	0.32600	0.30900	0.31800	0.35600	0.29100	0.33500	0.33700	0.30700
16234-002	0.30800	0.28900	0.31200	0.27500	0.24100	0.25100	0.29300	0.29400
16234-003	0.12000	0.09100	0.07300	0.15000	0.08000	0.04000	0.09300	0.07100

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
16234-000	0.27900	0.26900	0.28300	0.29200	0.29300	0.27100	0.24900	0.28900
16234-001	0.32600	0.30900	0.31800	0.35600	0.32333	0.33500	0.33700	0.30700
16234-002	0.30800	0.28900	0.31200	0.27500	0.24100	0.27889	0.29300	0.29400
16234-003	0.17143	0.22750	0.18250	0.21429	0.20000	0.13333	0.23250	0.23666

CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 20 Sep-07 10:38 AM
 Analysis: 11-8957-6453

Mysidopsis 7-d Survival, Growth and Fecundity Test				EnviroSystems, Inc.	
Test No:	02-9890-7741	Test Type:	Growth-Survival-Fec (7d)	Duration:	6d 18h
Start Date:	12 Sep-07 03:40 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Mysidopsis bahia
Ending Date:	19 Sep-07 09:50 AM	Dil Water:	Not Applicable	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	12 Sep-07 03:40 PM	Brine:	Not Applicable		

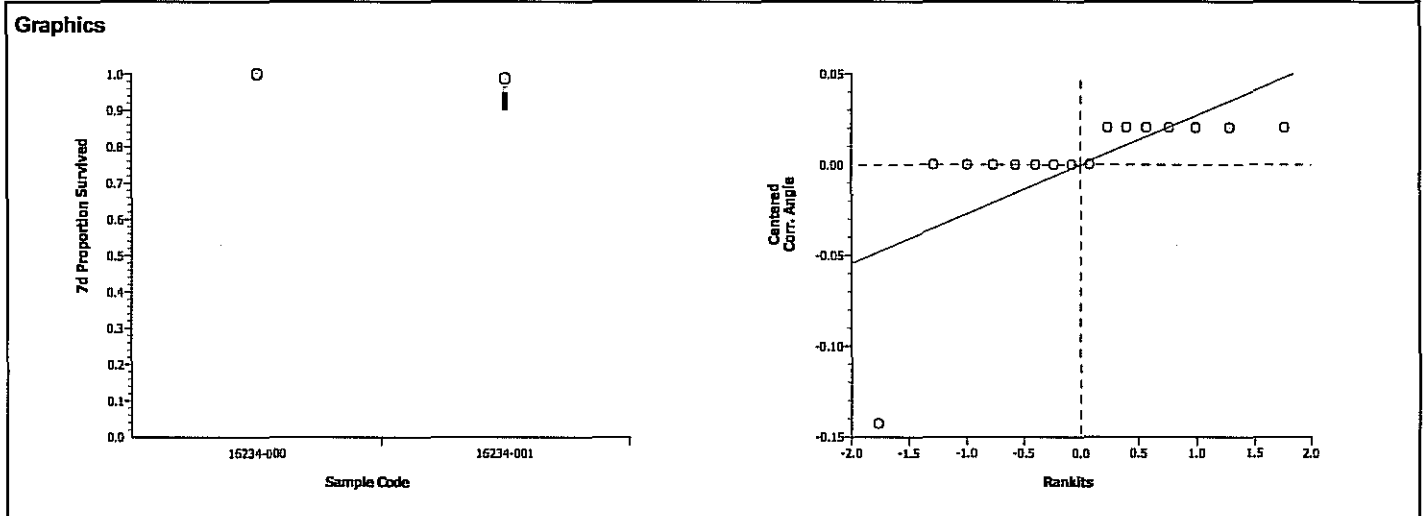
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
7d Proportion Survived	Comparison		03-1251-8257	03-1251-8257	20 Sep-07 10:34 AM	CETISv1.026		
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	13082630000	8.88539	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.00166	0.00166	1	1.00	0.33428	Non-Significant Effect
Error	0.0232394	0.00166	14			
Total	0.02489937	0.0033199	15			

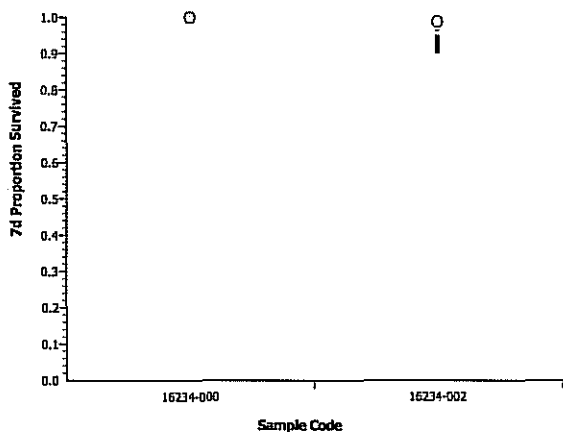
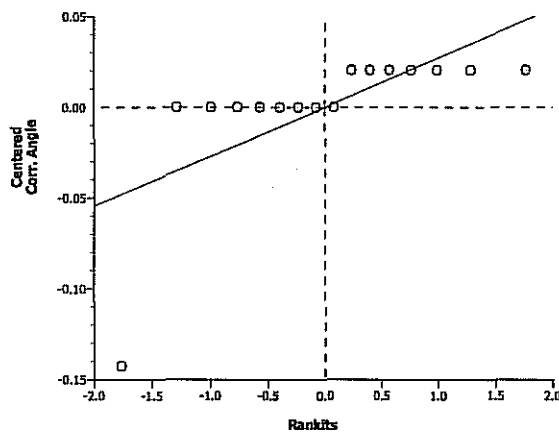
Group Comparisons						
Sample	vs	Sample	Statistic	Critical	P Level	Decision(0.05)
16234-000		16234-001	36		0.3605	1 Non-Significant Effect

Data Summary		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	8	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00025
16234-001	8	0.98750	0.90000	1.00000	0.03536	1.39164	1.24905	1.41202	0.05762



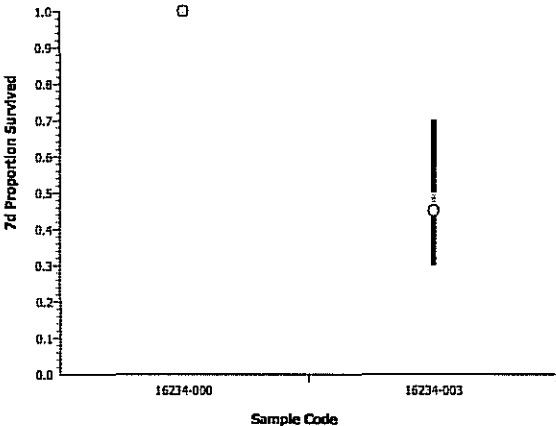
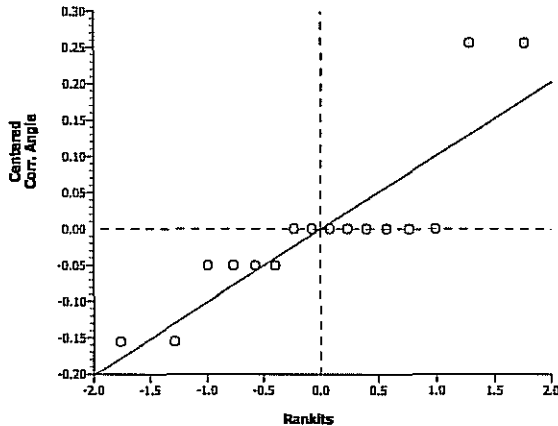
CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 20 Sep-07 10:38 AM
 Analysis: 13-7819-7995

Mysidopsis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.													
Test No:	02-9890-7741		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 18h											
Start Date:	12 Sep-07 03:40 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Mysidopsis bahia											
Ending Date:	19 Sep-07 09:50 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N											
Setup Date:	12 Sep-07 03:40 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
7d Proportion Survived		Comparison		03-1251-8257		03-1251-8257		20 Sep-07 10:34 AM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units		ChV	MSDp								
Mann-Whitney U		C > T	Angular (Corrected)			N/A													
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Variance Ratio		13082630000		8.88539		0.00000		Unequal Variances									
Distribution		Shapiro-Wilk W		0.46890		0.84420		0.00000		Non-normal Distribution									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0.00166		0.00166		1		1.00		0.33428		Non-Significant Effect							
Error		0.0232394		0.00166		14													
Total		0.02489937		0.0033199		15													
Group Comparisons																			
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)						
16234-000			16234-002		36				0.3605		1		Non-Significant Effect						
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
16234-000		8		1.00000		1.00000		1.00000		0.00000		1.41202		1.41202		1.41202		0.00025	
16234-002		8		0.98750		0.90000		1.00000		0.03536		1.39164		1.24905		1.41202		0.05762	
Graphics																			
																			
																			

CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 20 Sep-07 10:38 AM
 Analysis: 01-3547-7941

Mysidopsis 7-d Survival, Growth and Fecundity Test							EnviroSystems, Inc.		
Test No: 02-9890-7741		Test Type: Growth-Survival-Fec (7d)			Duration: 6d 18h				
Start Date: 12 Sep-07 03:40 PM		Protocol: EPA/821/R-02-014 (2002)			Species: Mysidopsis bahia				
Ending Date: 19 Sep-07 09:50 AM		Dil Water: Not Applicable			Source: ARO - Aquatic Research Organisms, N				
Setup Date: 12 Sep-07 03:40 PM		Brine: Not Applicable							
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
7d Proportion Survived		Comparison		03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U		C > T	Angular (Corrected)		N/A				
ANOVA Assumptions									
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)			
Variances		Variance Ratio	10674580000	8.88539	0.00000	Unequal Variances			
Distribution		Shapiro-Wilk W	0.75452	0.84420	0.00033	Non-normal Distribution			
ANOVA Table									
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)		
Between		1.833085	1.833085	1	135.34	0.00000	Significant Effect		
Error		0.1896186	0.0135442	14					
Total		2.02270404	1.8466296	15					
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
16234-000		16234-003	64		0.0001	4	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	8	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00025
16234-003	8	0.45000	0.30000	0.70000	0.16036	0.73506	0.57964	0.99116	0.16459
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 5 of 5

Report Date: 20 Sep-07 10:38 AM

Analysis: 15-1673-4402

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 02-9890-7741	Test Type: Growth-Survival-Fec (7d)	Duration: 6d 18h
Start Date: 12 Sep-07 03:40 PM	Protocol: EPA/821/R-02-014 (2002)	Species: Mysidopsis bahia
Ending Date: 19 Sep-07 09:50 AM	Dil Water: Not Applicable	Source: ARO - Aquatic Research Organisms, N
Setup Date: 12 Sep-07 03:40 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.00000	8.88539	1.00000	Equal Variances
Distribution	Shapiro-Wilk W	0.39803	0.84420	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0	0	1	0.00	1.00000	Non-Significant Effect
Error	0.0464788	0.0033199	14			
Total	0.04647883	0.0033199	15			

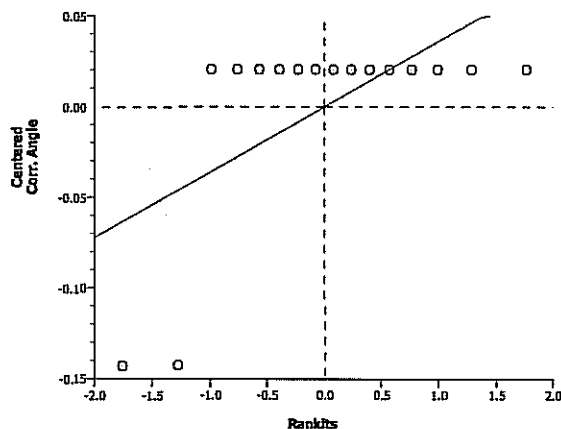
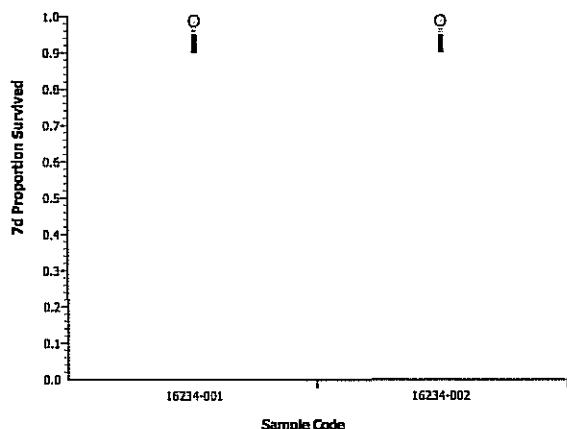
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
16234-001		16234-002	32		0.4796	2	Non-Significant Effect

Data Summary

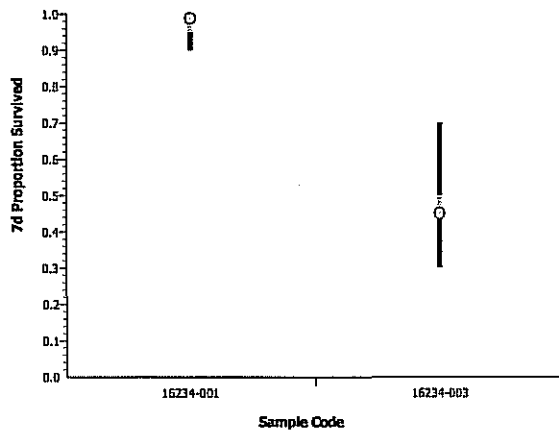
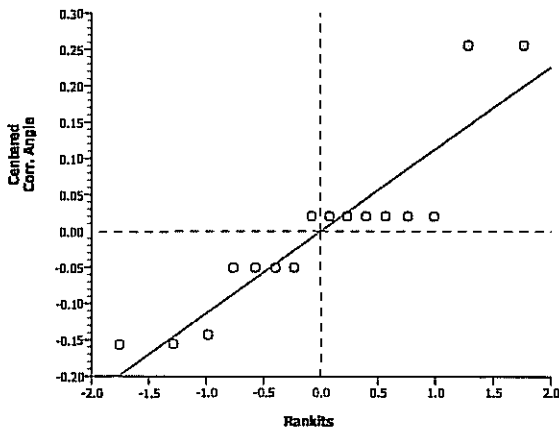
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	8	0.98750	0.90000	1.00000	0.03536	1.39164	1.24905	1.41202	0.05762
16234-002	8	0.98750	0.90000	1.00000	0.03536	1.39164	1.24905	1.41202	0.05762

Graphics



CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 20 Sep-07 10:38 AM
 Analysis: 08-7906-3079

Mysidopsis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	02-9890-7741	Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 18h			
Start Date:	12 Sep-07 03:40 PM	Protocol:	EPA/821/R-02-014 (2002)		Species:	Mysidopsis bahia			
Ending Date:	19 Sep-07 09:50 AM	Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	12 Sep-07 03:40 PM	Brine:	Not Applicable						
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
7d Proportion Survived	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026				
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	8.15935	8.88539	0.01284	Equal Variances				
Distribution	Shapiro-Wilk W	0.82785	0.84420	0.00541	Non-normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	1.724421	1.724421	1	113.42	0.00000	Significant Effect			
Error	0.212858	0.0152042	14						
Total	1.93727942	1.7396255	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
16234-001		16234-003	64		0.0001	4	Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	8	0.98750	0.90000	1.00000	0.03536	1.39164	1.24905	1.41202	0.05762
16234-003	8	0.45000	0.30000	0.70000	0.16036	0.73506	0.57964	0.99116	0.16459
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 1 of 5
Report Date: 20 Sep-07 10:40 AM
Analysis: 01-2002-6068

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 02-9890-7741 Test Type: Growth-Survival-Fec (7d) Duration: 6 days
Start Date: 12 Sep-07 03:40 PM Protocol: EPA/821/R-02-014 (2002) Species: *Mysidopsis bahia*
Ending Date: 19 Sep-07 09:50 AM Dil Water: Not Applicable Source: ARO - Aquatic Research Organisms, N
Setup Date: 12 Sep-07 03:40 PM Brine: Not Applicable
One Lafayette Road
P.O. Box 778
Hampton, N.H. 03843-0778
(603) 926-3345 • (603) 926-3521 Fax

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.90761	8.88539	0.41349	Equal Variances
Distribution	Shapiro-Wilk W	0.96597	0.84420	0.73539	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0078322	0.0078322	1	24.50	0.00021	Significant Effect
Error	0.0044748	0.0003196	14			
Total	0.01230705	0.0081519	15			

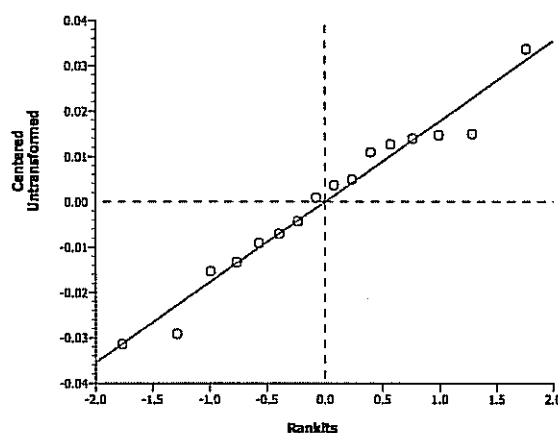
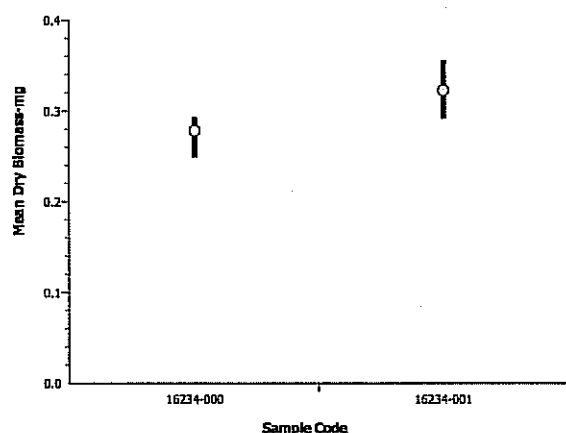
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-000		16234-001	-4.9501	1.76131	0.9999	0.01574	Non-Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	8	0.27813	0.24900	0.29300	0.01483				
16234-001	8	0.32238	0.29100	0.35600	0.02048				

Graphics



CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 20 Sep-07 10:40 AM
 Analysis: 03-4657-3352

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 02-9890-7741 Test Type: Growth-Survival-Fec (7d) Duration: 6d, 18h
 Start Date: 12 Sep-07 03:40 PM Protocol: EPA/821/R-02-014 (2002) Species: Mysidopsis bahia
 Ending Date: 19 Sep-07 09:50 AM Dil Water: Not Applicable Source: ARO - Aquatic Research Organisms, N
 Setup Date: 12 Sep-07 03:40 PM Brine: Not Applicable
 P.O. Box 779
 Hampton, N.H. 03843-0778
 (603) 926-3345 • (603) 926-3521 Fax
 www.envirosystems.com

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.97248	8.88539	0.17393	Equal Variances
Distribution	Shapiro-Wilk W	0.92827	0.84420	0.22590	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	9.024E-05	9.024E-05	1	0.21	0.65638	Non-Significant Effect
Error	0.0061137	0.0004367	14			
Total	0.00620392	0.0005269	15			

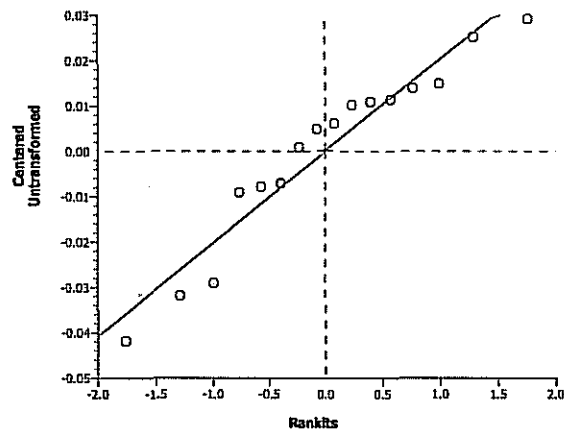
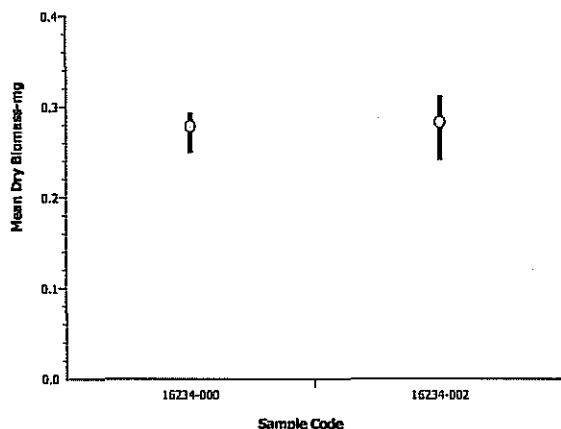
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-000		16234-002	-0.4546	1.76131	0.6718	0.01840	Non-Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	8	0.27813	0.24900	0.29300	0.01483				
16234-002	8	0.28287	0.24100	0.31200	0.02556				

Graphics



CETIS Analysis Detail

Comparisons: Page 4 of 5
Report Date: 20 Sep-07 10:40 AM
Analysis: 12-8058-8834

Mysidopsis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	02-9890-7741		Test Type:	Growth-Survival-Fec (7d)		Duration:	6 days, 18 hrs.		
Start Date:	12 Sep-07 03:40 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	One Statistic Report Mysidopsis bahia		
Ending Date:	19 Sep-07 09:50 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N Hampton, N.H. 03843-0778 (603) 926-3345 • (603) 926-3521 Fax		
Setup Date:	12 Sep-07 03:40 PM		Brine:	Not Applicable					
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version				
Mean Dry Biomass-mg	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026				
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed				N/A			
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	5.04200	8.88539	0.04879	Equal Variances				
Distribution	Shapiro-Wilk W	0.96203	0.84420	0.66666	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.141941	0.141941	1	213.70	0.00000	Significant Effect			
Error	0.0092987	0.0006642	14						
Total	0.15123966	0.1426052	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-000		16234-003	14.6187	1.76131	0.0000	0.0227	Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	8	0.27813	0.24900	0.29300	0.01483				
16234-003	8	0.08975	0.04000	0.15000	0.03329				
Graphics									

CETIS Analysis Detail

Comparisons: Page 3 of 5
Report Date: 20 Sep-07 10:40 AM
Analysis: 07-0641-0034

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 02-9890-7741 Test Type: Growth-Survival-Fec (7d) Duration: 6d 18h
Start Date: 12 Sep-07 03:40 PM Protocol: EPA/821/R-02-014 (2002) Species: Mysidopsis bahia
Ending Date: 19 Sep-07 09:50 AM Dil Water: Not Applicable Source: ARO - Aquatic Research Organisms, N
Setup Date: 12 Sep-07 03:40 PM Brine: Not Applicable
One Lafayette Road
P.O. Box 778
Hampton, N.H. 03843-0778
(603) 926-3345 • (603) 926-3521 Fax
www.envirosystems.com

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.55823	8.88539	0.57273	Equal Variances
Distribution	Shapiro-Wilk W	0.95931	0.84420	0.61969	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0062411	0.0062411	1	11.63	0.00422	Significant Effect
Error	0.0075105	0.0005365	14			
Total	0.01375157	0.0067775	15			

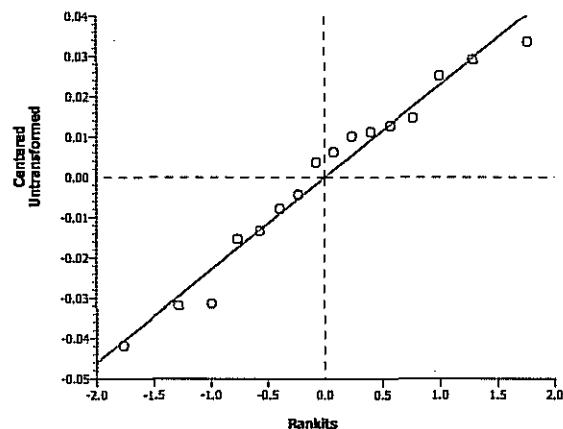
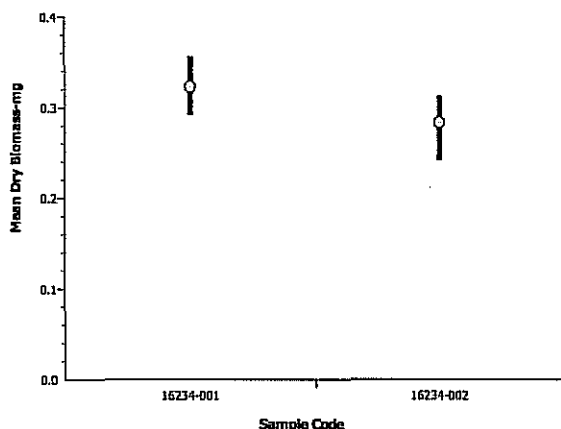
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-001		16234-002	3.41083	1.76131	0.0021	0.0204	Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	8	0.32238	0.29100	0.35600	0.02048				
16234-002	8	0.28287	0.24100	0.31200	0.02556				

Graphics



CETIS Analysis Detail

Comparisons: Page 5 of 5
Report Date: 20 Sep-07 10:40 AM
Analysis: 15-1918-6347

Mysidopsis 7-d Survival, Growth and Fecundity Test

EnviroSystems, Inc.

Test No: 02-9890-7741 Test Type: Growth-Survival-Fec (7d) Duration: 68 hrs, Inc.
Start Date: 12 Sep-07 03:40 PM Protocol: EPA/821/R-02-014 (2002) Species: Mysidopsis bahia
Ending Date: 19 Sep-07 09:50 AM Dil Water: Not Applicable Source: ARO Aquatic Research Organisms, N
Setup Date: 12 Sep-07 03:40 PM Brine: Not Applicable
One Lafayette Road
P.O. Box 778
Hampton, N.H. 03843-0778
(603) 926-3345 • (603) 926-3521 Fax
www.envirosystems.com

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	03-1251-8257	03-1251-8257	20 Sep-07 10:35 AM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	2.64310	8.88539	0.22304	Equal Variances
Distribution	Shapiro-Wilk W	0.97426	0.84420	0.87102	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.2164579	0.2164579	1	283.34	0.00000	Significant Effect
Error	0.0106955	0.000764	14			
Total	0.22715343	0.2172219	15			

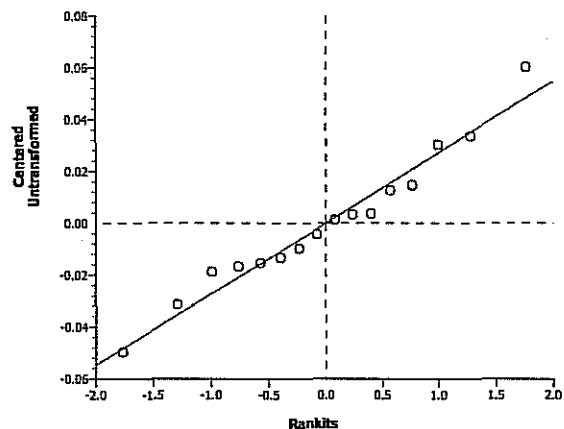
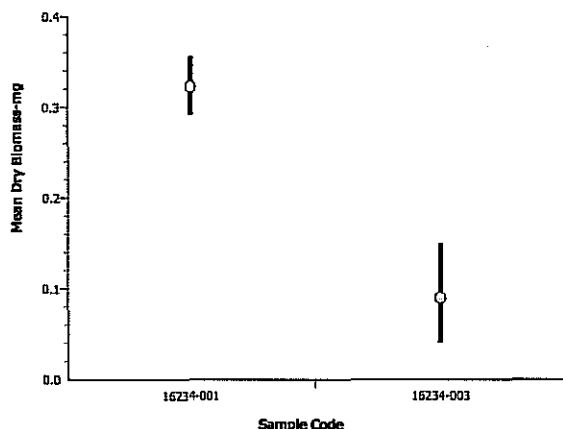
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-001		16234-003	16.8326	1.76131	0.0000	0.02434	Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	8	0.32238	0.29100	0.35600	0.02048				
16234-003	8	0.08975	0.04000	0.15000	0.03329				

Graphics





Aquatic Research Organisms

rec. 9/12/07

DATA SHEET

I. Organism History

Species: AMERICANYSIS bahia

Source: Lab reared ☒ Hatchery reared ☐ Field collected ☐

Hatch date 9-5-07 Receipt date

Lot number 090507MS Strain

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity 530 ppt DO

pH 7.8 Hardness ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ☒ Phytoplankton ☐ Trout Chow ☒

Brine Shrimp ☒ Rotifers ☐ Other ENCAP SHRIMP DIET

Prophylactic Treatments:

Comments:

IV. Shipping Information

Client: EST # of Organisms: 320+

Carrier: Date Shipped: 9-12-07

Biologist: Mark J. Jorgensen

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data

STUDY: <u>16234</u>	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: <u>9/12/07</u> INITIALS: <u>LB</u>		
SALINITY ADJUSTMENT RECORD: <u>1000</u> mL -001 + <u>0</u> g SALT					
SALINITY ADJUSTMENT RECORD: <u>1000</u> mL -002 + <u>0</u> g SALT					
SALINITY ADJUSTMENT RECORD: <u>1000</u> mL -003 + <u>0</u> g SALT					
SALINITY ADJUSTMENT RECORD: <u>1000</u> mL -004 + <u>0</u> g SALT					
SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	<u>6.6</u>	<u>7.76</u>	<u>47400</u>	<u>21</u>	<u>31</u>
-001	<u>6.5.69</u>	<u>7.11</u>	<u>46400</u>	<u>21</u>	<u>30</u>
-002	<u>6.6</u>	<u>7.09</u>	<u>46800</u>	<u>21</u>	<u>30</u>
-003	<u>6.0</u>	<u>7.05</u>	<u>46800</u>	<u>21</u>	<u>30</u>
-004					

METERS USED

DO meter # 19 DO probe # 12 pH meter # 470 pH probe # 48 S/C meter # 5130C S/C probe # 5130C
 SALINITY meter # 5130C

DATE & INITIALS FOR GAMETE PREPARATION: 9/12/07 LB

SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 121 X 10⁴ = SPM SOLUTION E = 1.21 X 10⁶
 SPERM CONCENTRATIONS: SOLUTION E X 40 = SOLUTION A = 4.84 X 10⁷ SPM
 SOLUTION E X 20 = SOLUTION B = 2.42 X 10⁷ SPM
 SOLUTION E X 5 = SOLUTION C = 6.65 X 10⁶ SPM

FINAL COUNTS:

FINAL SPERM COUNT: 4.84 X 10⁷
 FINAL EGG COUNT: 2300

TEST TIMES:

SPERM COLLECTED: 1615
 EGGS COLLECTED: 1615
 SPERM ADDED: 1635
 EGGS ADDED: 1735
 FIXATIVE ADDED: 1755

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: 16234		CLIENT: Battelle - New Bedford
SPECIES: <i>A. punctulata</i>		
		Day: 0
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	100	16263
-001	↓	-001
-002		-002
-003		-003
-004		
INITIALS:	LB	
TIME:	1356	
DATE:	9/12/07	

FERTILIZATION COUNTS

STUDY	CLIENT	LOCATION	DATE	INITIALS
16234	BATTELLE	New Bedford	9/13/07	LB
SAMPLE	REPLICATE VIAL			
	1	2	3	4
	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL
Lab Control	98/109	88/103	85/109	92/100
-001	99/110	94/100	97/103	99/107
-002	100/104	100/108	99/108	96/100
-003	90/100	106/114	100/124	84/104
-004				

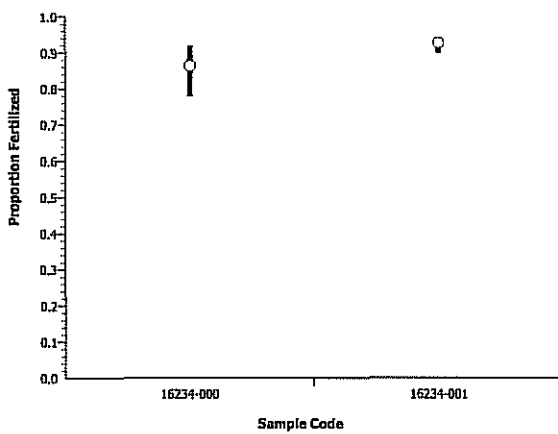
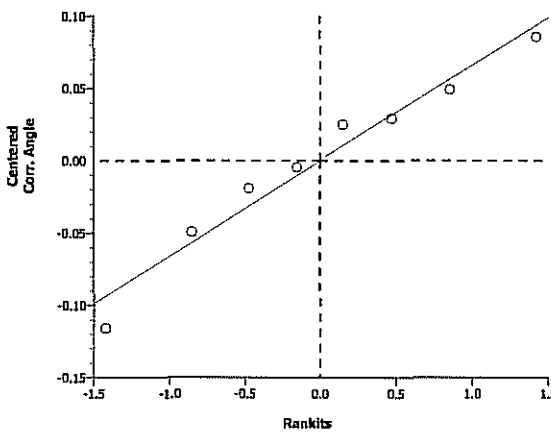
CETIS Test Summary

Report Date: 13 Sep-07 9:26 PM
 Link: 17-8040-2040

Arbacia Sperm Cell Fertilization Test					EnviroSystems, Inc.		
Test No:	17-8705-3341	Test Type:	Fertilization	Duration:	80m		
Start Date:	12 Sep-07 04:35 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata		
Ending Date:	12 Sep-07 05:55 PM	Dil Water:	Not Applicable	Source:	In-House Culture		
Setup Date:	12 Sep-07 04:35 PM	Brine:	Not Applicable				
Sample No:	07-3947-2649	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	12 Sep-07 03:00 PM	Code:	16234-000	Project:	Ecological Risk Assessment		
Receive Date:	12 Sep-07 03:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	95m	Station:	WQ-TOX-Lab Control				
Sample No:	10-1282-1229	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 09:01 AM	Code:	16234-001	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	32h	Station:	WQ-TOX-001				
Sample No:	06-2367-6386	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 09:45 AM	Code:	16234-002	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	31h	Station:	WQ-TOX-002				
Sample No:	12-6128-6246	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 10:15 AM	Code:	16234-003	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	30h	Station:	WQ-TOX-003				
Proportion Fertilized Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16234-000	4	0.86332	0.77982	0.92000	0.03102	0.06203	7.19%
16234-001	4	0.92675	0.90000	0.94175	0.00965	0.01931	2.08%
16234-002	4	0.94103	0.91667	0.96154	0.01155	0.02311	2.46%
16234-003	4	0.84402	0.79245	0.90000	0.02631	0.05261	6.23%
Proportion Fertilized Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
16234-000	0.89908	0.85437	0.77982	0.92000			
16234-001	0.90000	0.94000	0.94175	0.92523			
16234-002	0.96154	0.92593	0.91667	0.96000			
16234-003	0.90000	0.87719	0.80645	0.79245			

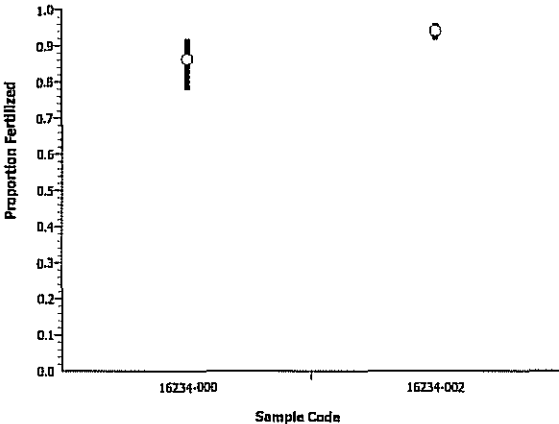
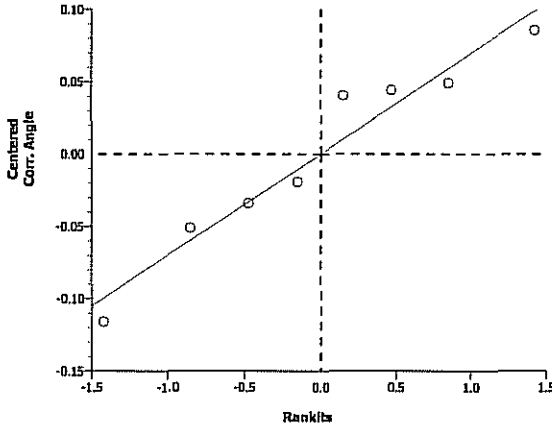
CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 13 Sep-07 9:26 PM
 Analysis: 06-8630-7781

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.									
Test No:	17-8705-3341		Test Type:		Fertilization		Duration:	80m							
Start Date:	12 Sep-07 04:35 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata							
Ending Date:	12 Sep-07 05:55 PM		Dil Water:		Not Applicable		Source:	In-House Culture							
Setup Date:	12 Sep-07 04:35 PM		Brine:		Not Applicable										
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version					
Proportion Fertilized		Comparison		17-8040-2040		17-8040-2040		13 Sep-07 9:25 PM		CETISv1.026					
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units		ChV	MSDp				
Equal Variance t		C > T	Angular (Corrected)			N/A									
ANOVA Assumptions															
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)					
Variances		Variance Ratio		6.04834		47.46723		0.17352		Equal Variances					
Distribution		Shapiro-Wilk W		0.96933		0.74935		0.87570		Normal Distribution					
ANOVA Table															
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)			
Between		0.0200063		0.0200063		1		4.37		0.08157		Non-Significant Effect			
Error		0.0274746		0.0045791		6									
Total		0.04748086		0.0245854		7									
Group Comparisons															
Sample		vs		Sample		Statistic		Critical		P Level		MSD		Decision(0.05)	
16234-000				16234-001		-2.0902		1.94318		0.9592		0.09298		Non-Significant Effect	
Data Summary															
Sample Code		Count	Original Data				Transformed Data								
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD					
16234-000		4	0.86332	0.77982	0.92000	0.06203	1.19830	1.08237	1.28404	0.08865					
16234-001		4	0.92675	0.90000	0.94175	0.01931	1.29831	1.24905	1.32703	0.03605					
Graphics															
															

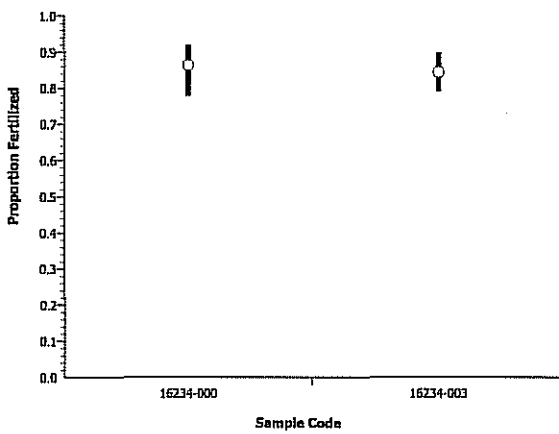
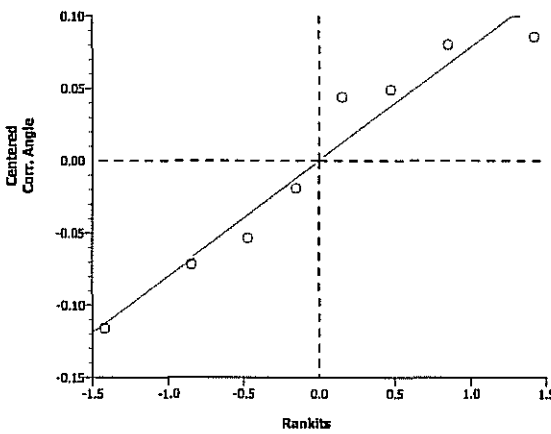
CETIS Analysis Detail

Comparisons: Page 5 of 5
 Report Date: 13 Sep-07 9:26 PM
 Analysis: 11-0659-7912

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	17-8705-3341	Test Type:	Fertilization	Duration:	80m				
Start Date:	12 Sep-07 04:35 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata				
Ending Date:	12 Sep-07 05:55 PM	Dil Water:	Not Applicable	Source:	In-House Culture				
Setup Date:	12 Sep-07 04:35 PM	Brine:	Not Applicable						
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		17-8040-2040	17-8040-2040	13 Sep-07 9:25 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	3.20421	47.46723	0.36444	Equal Variances				
Distribution	Shapiro-Wilk W	0.94247	0.74935	0.59816	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0341604	0.0341604	1	6.63	0.04211	Significant Effect			
Error	0.0309346	0.0051558	6						
Total	0.06509499	0.0393162	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-000		16234-002	-2.5740	1.94318	0.9789	0.09866	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	4	0.86332	0.77982	0.92000	0.06203	1.19830	1.08237	1.28404	0.08865
16234-002	4	0.94103	0.91667	0.96154	0.02311	1.32899	1.27795	1.37340	0.04952
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 13 Sep-07 9:26 PM
 Analysis: 07-8728-6560

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.													
Test No:	17-8705-3341		Test Type:		Fertilization		Duration:	80m											
Start Date:	12 Sep-07 04:35 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata											
Ending Date:	12 Sep-07 05:55 PM		Dil Water:		Not Applicable		Source:	In-House Culture											
Setup Date:	12 Sep-07 04:35 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
Proportion Fertilized		Comparison		17-8040-2040		17-8040-2040		13 Sep-07 9:25 PM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp									
Equal Variance t		C > T	Angular (Corrected)			N/A													
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Variance Ratio		1.44805		47.46723		0.76828		Equal Variances									
Distribution		Shapiro-Wilk W		0.91859		0.74935		0.39111		Normal Distribution									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0.0017504		0.0017504		1		0.26		0.62608		Non-Significant Effect							
Error		0.0398582		0.0066430		6													
Total		0.04160862		0.0083934		7													
Group Comparisons																			
Sample		vs	Sample		Statistic		Critical		P Level		MSD		Decision(0.05)						
16234-000			16234-003		0.51332		1.94318		0.3130		0.11199		Non-Significant Effect						
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
16234-000		4		0.86332		0.77982		0.92000		0.06203		1.19830		1.08237		1.28404		0.08865	
16234-003		4		0.84402		0.79245		0.90000		0.05261		1.16871		1.09778		1.24905		0.07367	
Graphics																			
																			

CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 13 Sep-07 9:26 PM
 Analysis: 09-6777-5538

Arbacia Sperm Cell Fertilization Test

EnviroSystems, Inc.

Test No:	17-8705-3341	Test Type:	Fertilization	Duration:	80m
Start Date:	12 Sep-07 04:35 PM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata
Ending Date:	12 Sep-07 05:55 PM	DII Water:	Not Applicable	Source:	In-House Culture
Setup Date:	12 Sep-07 04:35 PM	Brine:	Not Applicable		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Fertilized	Comparison	17-8040-2040	17-8040-2040	13 Sep-07 9:26 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.88762	47.46723	0.61487	Equal Variances
Distribution	Shapiro-Wilk W	0.86563	0.74935	0.13703	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.001882	0.001882	1	1.00	0.35521	Non-Significant Effect
Error	0.0112560	0.0018760	6			
Total	0.01313802	0.003758	7			

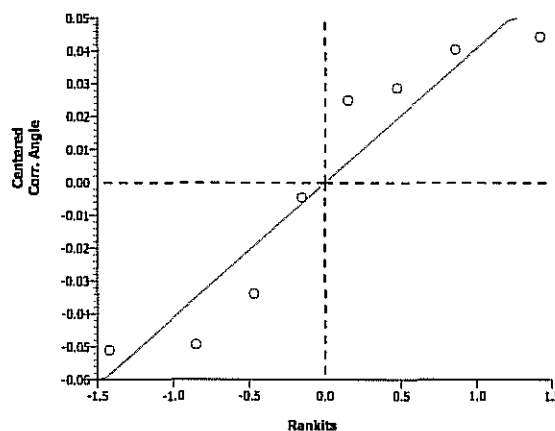
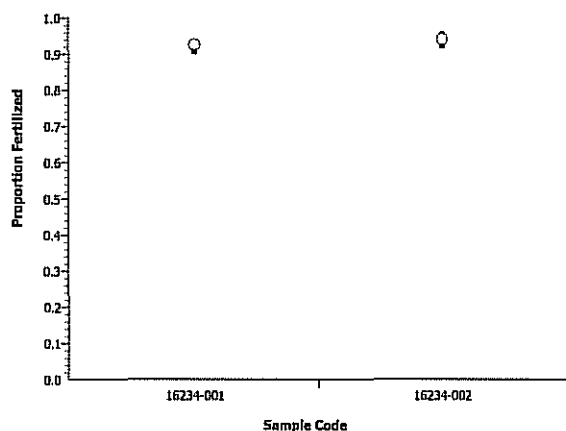
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-001		16234-002	-1.0016	1.94318	0.8224	0.05951	Non-Significant Effect

Data Summary

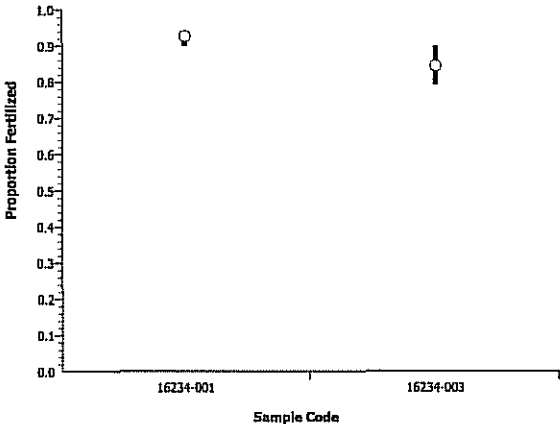
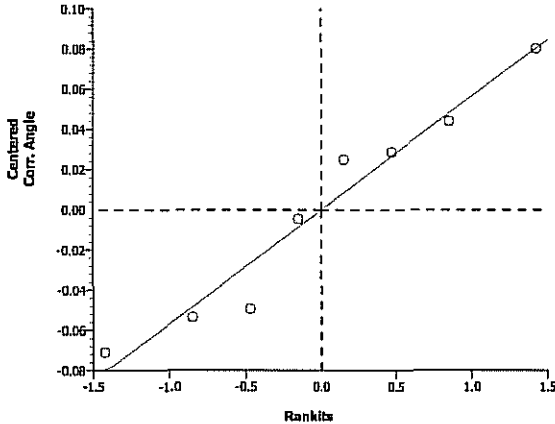
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	4	0.92675	0.90000	0.94175	0.01931	1.29831	1.24905	1.32703	0.03605
16234-002	4	0.94103	0.91667	0.96154	0.02311	1.32899	1.27795	1.37340	0.04952

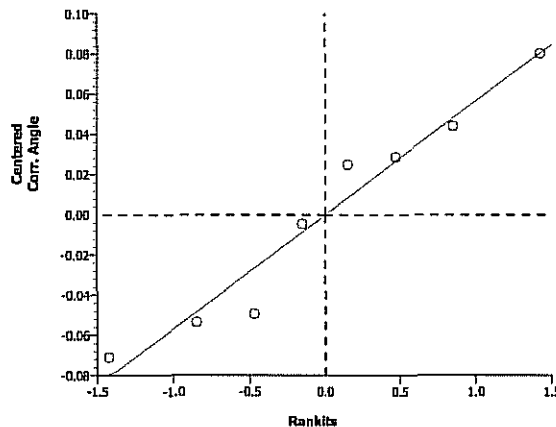
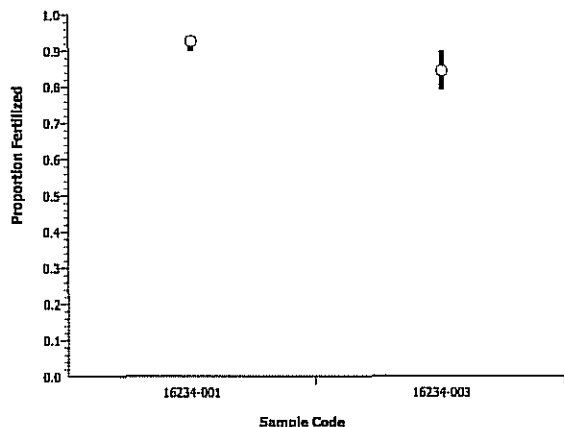
Graphics



CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 13 Sep-07 9:26 PM
 Analysis: 09-8828-1331

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	17-8705-3341		Test Type: Fertilization		Duration: 80m				
Start Date:	12 Sep-07 04:35 PM		Protocol: EPA/821/R-02-014 (2002)		Species: Arbacia punctulata				
Ending Date:	12 Sep-07 05:55 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	12 Sep-07 04:35 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Proportion Fertilized		Comparison		17-8040-2040	17-8040-2040	13 Sep-07 9:26 PM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	
Equal Variance t		C > T	Angular (Corrected)		N/A				MSDp
ANOVA Assumptions									
Attribute	Test	Statistic		Critical	P Level	Decision(0.01)			
Variances	Variance Ratio	4.17689		47.46723	0.27093	Equal Variances			
Distribution	Shapiro-Wilk W	0.93882		0.74935	0.56247	Normal Distribution			
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0335920	0.0335920	1	9.99	0.01956	Significant Effect			
Error	0.0201797	0.0033633	6						
Total	0.05377168	0.0369553	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-001		16234-003	3.16036	1.94318	0.0098	0.07969	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	4	0.92675	0.90000	0.94175	0.01931	1.29831	1.24905	1.32703	0.03605
16234-003	4	0.84402	0.79245	0.90000	0.05261	1.16871	1.09778	1.24905	0.07367
Graphics									
									



***Champia parvula* Sexual Reproduction Test Quality Assurance Summary**

Client	ESI Ltd.	SRC Sample #	E 565, 566, 567
File #	MM478	Test Initiation Date	Sept 13/07
Analyst	M. Moody	Test Completion Date	Sept 20/07
Sample Identity	0901-001, 0945-002, 1015-003, (all also labeled 091107)		

Test Type: Chronic, Definitive, Single-concentration (100%)

Test Organisms Species: *Champia parvula*, sexually mature male and female branches, in good health, males having sori with spermatia, females having trichogynes.

Test Conditions (additional information on following page)

Method: EPA-821-R-02-014 Method 1009.0, (Third edition, October 2002) static, non-renewal; 2-day effluent exposure followed by 5 to 7 day recovery period in control medium for cystocarp development.

Exposure/Dilution Medium: natural seawater collected at Pacific Environmental Science Centre, North Vancouver, B.C., filtered to 0.2µm and autoclaved before use, adjusted to salinity 30 ppt. and enriched with 10 ml/L Test Nutrient Solution, Table 1 of method cited.

Recovery Medium: natural seawater (same as for exposure medium), enriched with 10 ml/L Culture Nutrient Solution (method section 16.10.1.3).

Reference Toxicant Test

Method: EPA-821-R-02-014, Method 1009.0, static, non-renewal; 2-day exposure followed by 5 to 7 day recovery period in control medium for cystocarp development. See control performance and reference toxicant charts for additional information.

Test conditions: performed under same experimental conditions as effluent sample.

Compound: sodium dodecyl sulphate mg/L

Date of test: Aug 29/07	Historic value, warning limits $\pm 2SD$
IC ₅₀ (95 % CL) mg/L 1.22 (1.08 - 1.30)	1.32 (1.06 - 1.64)

Quality Control Data

Control mortality: no control mortality was observed in any control solution during observation periods.

Mean number of cystocarps per plant counted in this test (must be >10 to be acceptable).

mean control cystocarps per female	19.0
% survival in Control	100

Cystocarp Counts (mean per female branch)

Control, natural seawater	19.0
0901-001 (091107)	20.8
0945-002 (091107)	27.4
1015-003 (091107)	5.5
Signature: <i>Con Moody</i> Date: <i>Nov 16/07</i>	

Test Data Summary

Samples				SRC#	<u>E565, 566, 567</u>
Identification/Type	<u>0901-001, 0945-002, 1015-003, (all also labeled 091107)</u>			Analyst	<u>Mary Moody</u>
Date/Time Received	<u>Sept 12/07 @ 1600 hr</u>	Date Shipped	<u>Sept 11/07</u>	Temperature Upon Receipt (°C)	<u>3 with ice packs</u>
Test Initiation Date	<u>Sept 13/07</u>	Test Completion Date	<u>Sept 20/07</u>		

Organism Information

Species	<u>Champia parvula</u>	Appearance/Health of <i>Champia</i>	<u>excellent</u>
Source	<u>sexually mature male and female branches, obtained from USEPA, Hatfield Marine Science Center, Newport, Oregon, 1995</u>		
Females, Presence of Trichogynes	<u>yes</u>	Males, Presence of Sori with Spermatia	<u>yes</u>

Test Conditions

Test Method	<u>EPA-821-R-02-014, Method 1009.0</u>	Dilution/control water	<u>Natural Seawater</u>
Test Type	<u>Chronic definitive single concentration</u>		
Test Vessels (Exposure & Recovery)	<u>270 mL transparent polystyrene cups, transparent polystyrene lids</u>		
Exposure		Recovery	
Volume / Depth	<u>100 mL / 4.5 cm</u>	Volume / Depth	<u>200 mL / 7.3 cm</u>
Replicates/Conc.	<u>4</u>	No. of organisms (female/male)	<u>5/1</u>
Number and Concentrations of Test Solutions (%v/v)	Controls: natural sea water Tests: 100		
Chemicals added to control/dilution water	<u>Test Nutrients as described in method cited at 10 ml/L, analytical grade</u>		

Sample Treatment

D.O. before salinity adjustment (mg/L)	<u>see page 3</u>	D.O. at test start (mg/L)	<u>see page 3</u>
Aeration (duration/rate)	<u>none</u>	Filtration	<u>none</u>
Salinity Adjustment	<u>not required, all samples were at salinity of 30 ±2 ppt</u>		

Exposure Period (48 h)

Temperature, pH, D.O. and Salinity of test solutions and controls on following page		
Photoperiod (L:D h)	<u>16:8</u>	Agitation of tests and controls
		<u>gentle rotary shaking</u>

Recovery Period (5-7 d)

Aeration	<u>gentle aeration supplied</u>
Recovery Medium: natural sea water containing 10 ml/L Culture Nutrients (section 16.10.1.3 of cited method)	

Submitted By: mm **Date:** mm/1/07

Water Quality Data

Sample Identification 0901-001, 0945-002, 1015-003, (all also labeled 091107)

SRC# E 565, 566, 567

INITIAL WATER QUALITY	SAMPLES at test start			TEST MEDIUM	RECOVERY MEDIUM
sample #	0901-001	0945-002	1015-003		
Temperature (°C)	22	22	22	23	23
Dissolved Oxygen (mg/L)	901	8.8	7.3	7.8	7.8
pH	7.03	6.97	6.81	8.6	8.4
Salinity (ppt)	31	31	31	30	30
Description of sample	colorless	colorless	colorless		

Length of Recovery Period (days)

5

Water Quality Data during Exposure Period (0, 24, 48 hr)

Sample	Temperature (°C)			Dissolved Oxygen (mg/L)			pH			Salinity (ppt)		
	0	24	48	0	24	48	0	24	48	0	24	48
Control-NSW*	23	23	23	7.8	7.8	7.9	8.5	8.4	8.4	30	30	30
0901-001	23	23	23	7.8	7.8	7.8	7.5	8.3	8.4	31	31	31
0945-002	23	23	23	7.8	7.8	7.8	7.5	7.9	8.2	31	31	31
1015-003	23	23	23	7.8	7.8	7.8	6.4	8.0	8.3	31	31	31

*Natural Sea Water

Appearance of branches after 48 hours exposure

Condition of female branches	Control NSW	0901-001	0945-002	1015-003
description	normal*	normal	branches slightly paler than control	branches slightly paler than control

* Branches red (no green areas), firm but flexible

Champia (female) Mortality at end of Recovery Period

Condition of female branches	Control NSW	0901-001	0945-002	1015-003
# dead	0	0	0	0
% mortality	0	0	0	0
description	normal*	normal	normal	white with red tips

* Branches red (no green areas), firm but flexible

Initial/Date

gn
22/1/07

RECOVERY PERIOD - TEMPERATURE MONITORING (initial daily entries)

Day 0	Day 1	Day 2	Day 3	Day 4	Day 5
23	23	23	23	23	23

Test Data

Sample Identification 0901-001, 0945-002, 1015-003, (all also Analyst Mary Moody SRC# E 565, 566, 567
 labeled 091107)

Champia Raw Data												
Date		Sept 22/07										
Cystocarps per plant								Mean	SD	Group mean and SD		Comments
Control	NSW	12	23	18	20	40		22.6	10.5	19.0	Healthy red colour	
		19	21	20	19	24		20.6	2.1	6.7	Normal growth	
		27	13	22	12	15		17.8	6.5			
		10	20	16	16	13						
SRC#	% V/V											
0901-001	565	100	29	25	26	23	19	24.4	3.7	20.8	Healthy red colour	
		100	26	28	28	7	13	20.4	9.8	6.4	Normal growth	
		100	19	22	13	18	15	17.4	3.5			
		100	15	20	32	20	18	21.0	6.5			
0912-002	566	100	18	24	11	41	24	23.6	11.1	27.4	Healthy red colour	
		100	20	20	38	41	23	28.4	10.3	9.7	Normal growth	
		100	36	40	12	40	19	29.4	13.0			
		100	27	33	29	30	21	28.0	4.5			
1015-003	567	100	3	8	8	2	6	5.4	2.8	5.5	Branches white with red tips	
		100	8	7	10	11	5	8.2	2.4	3.6		
		100	1	2	3	0	2	1.6	1.1			
		100	2	12	3	8	8	6.6	4.1			

SD: Standard Deviation

Submitted by:

M. Moody

Date:

Nov 1/07

CETIS Test Summary

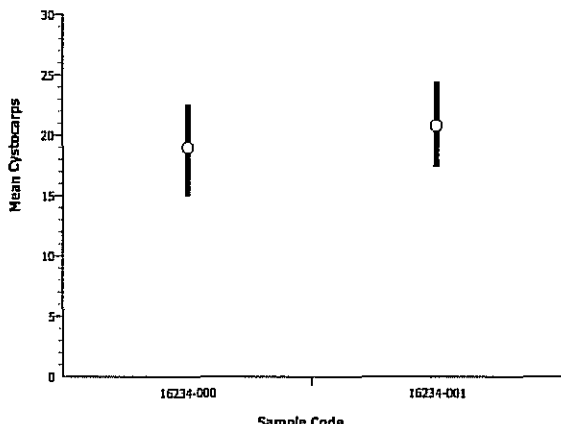
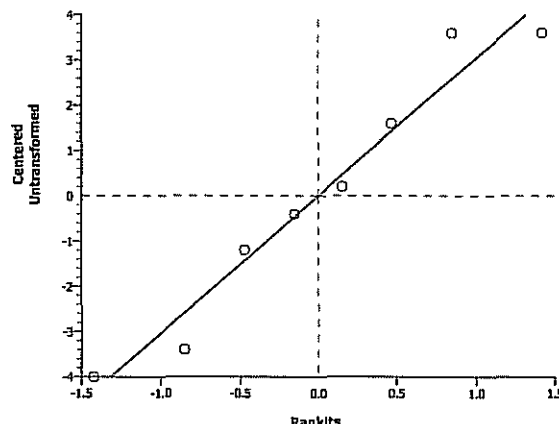
Report Date: 23 Sep-07 10:38 PM

Link: 12-6968-3452

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council		
Test No:	09-2886-5307	Test Type:	Champia	Duration:	7d 0h		
Start Date:	14 Sep-07 12:00 PM	Protocol:	EPA/600/4-91/003 (1994)	Species:	Champia parvula		
Ending Date:	21 Sep-07 12:00 PM	Dil Water:	Not Applicable	Source:	In-House Culture		
Setup Date:	14 Sep-07 12:00 PM	Brine:	Not Applicable				
Sample No:	07-3947-2649	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	12 Sep-07 03:00 PM	Code:	16234-000	Project:	Ecological Risk Assessment		
Receive Date:	12 Sep-07 03:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	45h	Station:	WQ-TOX-Lab Control				
Sample No:	10-1282-1229	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 09:01 AM	Code:	16234-001	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	75h	Station:	WQ-TOX-001				
Sample No:	06-2367-6386	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 09:45 AM	Code:	16234-002	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	74h	Station:	WQ-TOX-002				
Sample No:	12-6128-6246	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	11 Sep-07 10:15 AM	Code:	16234-003	Project:	Ecological Risk Assessment		
Receive Date:	11 Sep-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	74h	Station:	WQ-TOX-003				
Mean Cystocarps Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
16234-000	4	19	15	22.6	1.65731	3.31461	17.45%
16234-001	4	20.8	17.4	24.4	1.43527	2.87054	13.80%
16234-002	4	27.35	23.6	29.4	1.2842	2.5684	9.39%
16234-003	4	5.45	1.6	8.2	1.40564	2.81129	51.58%
Mean Cystocarps Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
16234-000	22.6	20.6	17.8	15			
16234-001	24.4	20.4	17.4	21			
16234-002	23.6	28.4	29.4	28			
16234-003	5.4	8.2	1.6	6.6			

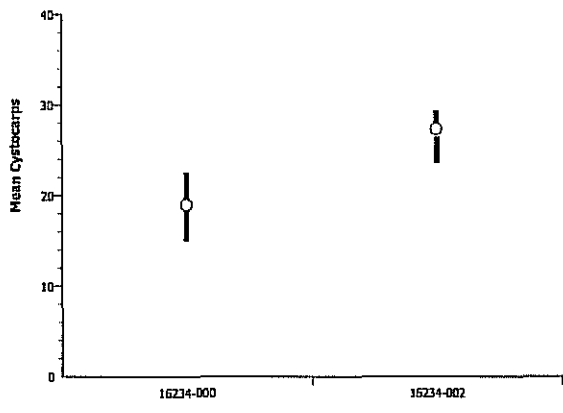
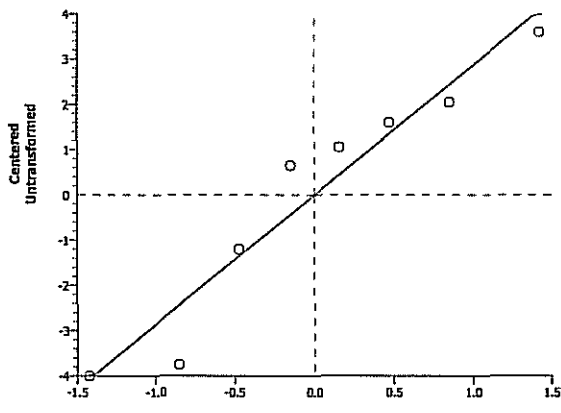
CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 23 Sep-07 10:39 PM
 Analysis: 08-1548-0324

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	09-2886-5307		Test Type: Champia		Duration: 7d 0h				
Start Date:	14 Sep-07 12:00 PM		Protocol: EPA/600/4-91/003 (1994)		Species: Champia parvula				
Ending Date:	21 Sep-07 12:00 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	14 Sep-07 12:00 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		12-6968-3452	12-6968-3452	23 Sep-07 10:38 PM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Untransformed		N/A				
ANOVA Assumptions									
Attribute		Test		Statistic	Critical	P Level	Decision(0.01)		
Variances		Variance Ratio		1.33333	47.46723	0.81873	Equal Variances		
Distribution		Shapiro-Wilk W		0.93303	0.74935	0.50867	Normal Distribution		
ANOVA Table									
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)		
Between		6.48	6.48	1	0.67	0.44303	Non-Significant Effect		
Error		57.68	9.613334	6					
Total		64.1600003	16.093334	7					
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-000		16234-001	-0.8210	1.94318	0.7785	4.26025	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	4	19	15	22.6	3.31461				
16234-001	4	20.8	17.4	24.4	2.87054				
Graphics									
									

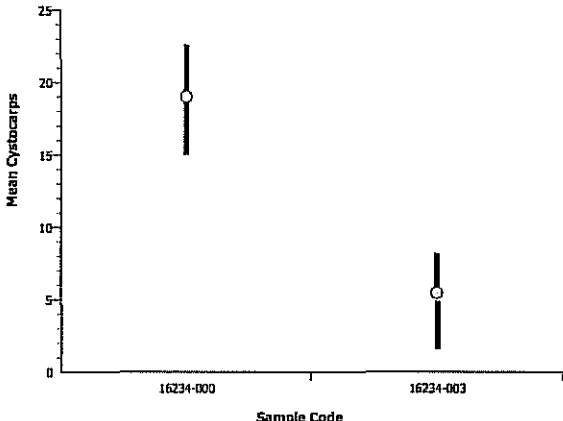
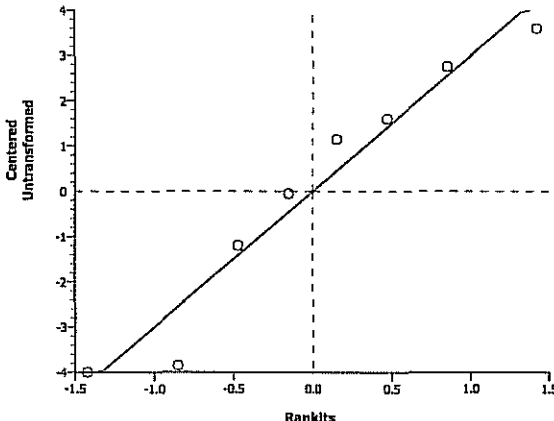
CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 23 Sep-07 10:39 PM
 Analysis: 02-3719-0631

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	09-2886-5307		Test Type: Champia		Duration: 7d 0h				
Start Date:	14 Sep-07 12:00 PM		Protocol: EPA/600/4-91/003 (1994)		Species: Champia parvula				
Ending Date:	21 Sep-07 12:00 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	14 Sep-07 12:00 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		12-6968-3452	12-6968-3452	23 Sep-07 10:38 PM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Untransformed		N/A				
ANOVA Assumptions									
Attribute	Test	Statistic		Critical	P Level	Decision(0.01)			
Variances	Variance Ratio	1.66549		47.46723	0.68545	Equal Variances			
Distribution	Shapiro-Wilk W	0.91440		0.74935	0.36146	Normal Distribution			
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	139.445	139.445	1	15.86	0.00726	Significant Effect			
Error	52.75	8.791667	6						
Total	192.195007	148.23667	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-000		16234-002	-3.9826	1.94318	0.9964	4.07412	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	4	19	15	22.6	3.31461				
16234-002	4	27.35	23.6	29.4	2.5684				
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 5 of 5
 Report Date: 23 Sep-07 10:39 PM
 Analysis: 12-3925-4913

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council			
Test No:	09-2886-5307	Test Type:	Champia	Duration:	7d 0h				
Start Date:	14 Sep-07 12:00 PM	Protocol:	EPA/600/4-91/003 (1994)	Species:	Champia parvula				
Ending Date:	21 Sep-07 12:00 PM	Dil Water:	Not Applicable	Source:	In-House Culture				
Setup Date:	14 Sep-07 12:00 PM	Brine:	Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		12-6968-3452	12-6968-3452	23 Sep-07 10:38 PM	CETISv1.026		
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.39013	47.46723	0.79310	Equal Variances				
Distribution	Shapiro-Wilk W	0.92576	0.74935	0.44646	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	367.205	367.205	1	38.88	0.00079	Significant Effect			
Error	56.67	9.445	6						
Total	423.874985	376.64999	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16234-000		16234-003	6.23524	1.94318	0.0004	4.22279	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-000	4	19	15	22.6	3.31461				
16234-003	4	5.45	1.6	8.2	2.81129				
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 23 Sep-07 10:39 PM
 Analysis: 07-2166-5817

Champia parvula Red Macroalga Sexual Reproduction Test Saskatchewan Research Council

Test No: 09-2886-5307	Test Type: Champia	Duration: 7d 0h
Start Date: 14 Sep-07 12:00 PM	Protocol: EPA/600/4-91/003 (1994)	Species: Champia parvula
Ending Date: 21 Sep-07 12:00 PM	Dil Water: Not Applicable	Source: In-House Culture
Setup Date: 14 Sep-07 12:00 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	12-6968-3452	12-6968-3452	23 Sep-07 10:38 PM	CETISv1.026

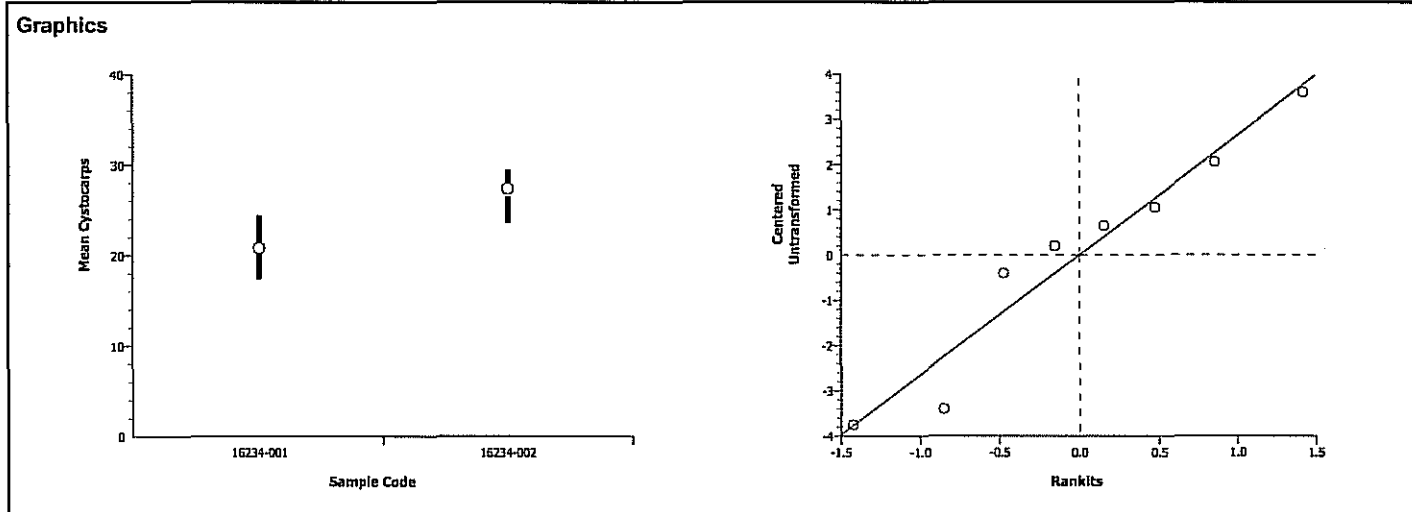
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.24912	47.46723	0.85926	Equal Variances
Distribution	Shapiro-Wilk W	0.93485	0.74935	0.52515	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	85.805	85.805	1	11.57	0.01448	Significant Effect
Error	44.51	7.418334	6			
Total	130.314999	93.223334	7			

Group Comparisons							
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-001		16234-002	-3.401	1.94318	0.9928	3.74241	Non-Significant Effect

Data Summary		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	4	20.8	17.4	24.4	2.87054				
16234-002	4	27.35	23.6	29.4	2.5684				



Detail

Comparisons: Page 2 of 5
 Report Date: 23 Sep-07 10:39 PM
 Analysis: 07-0627-1376

Macroalga Sexual Reproduction Test

Saskatchewan Research Council

86-5307 Test Type: Champia Duration: 7d 0h
 Sep-07 12:00 PM Protocol: EPA/600/4-91/003 (1994) Species: Champia parvula
 Sep-07 12:00 PM Dil Water: Not Applicable Source: In-House Culture
 14 Sep-07 12:00 PM Brine: Not Applicable

	Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
carps	Comparison		12-6968-3452	12-6968-3452	23 Sep-07 10:38 PM	CETISv1.026		
	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
variance t	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Variance Ratio	1.04260	47.46723	0.97345	Equal Variances
Distribution	Shapiro-Wilk W	0.93767	0.74935	0.55147	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	471.245	471.245	1	58.38	0.00026	Significant Effect
Error	48.43	8.071667	6			
Total	519.674995	479.31666	7			

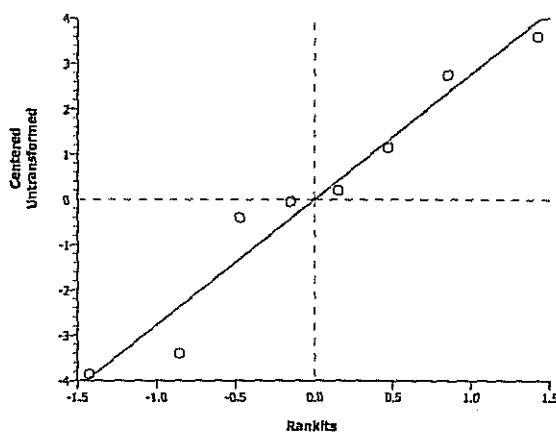
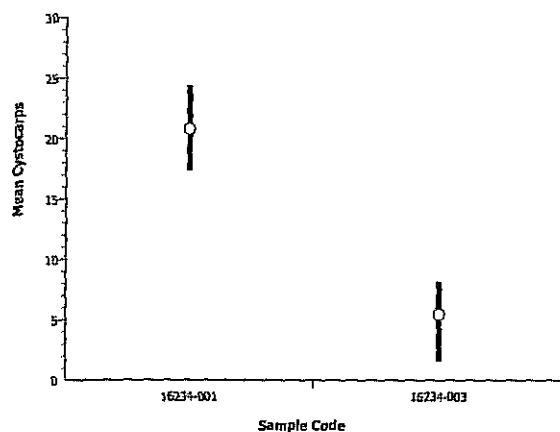
Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)
16234-001		16234-003	7.64085	1.94318	0.0001	3.90373	Significant Effect

Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16234-001	4	20.8	17.4	24.4	2.87054				
16234-003	4	5.45	1.6	8.2	2.81129				

Graphics



SALTWATER ASSAYS

A. bahia, *A. punctulata*, *C. parvula*

STUDY: 16234		LOCATION: New Bedford Harbor			
CHEMISTRY	Lab Salt Control	-001	-002	-003	-004
	16263				
AMMONIA	-008	-008	-004	-0036	
AS RECEIVED WATER QUALITIES	Lab Salt Control	-001	-002	-003	-004
SALINITY (ppt)	31	31	31	31	
pH (SU)	7.95	6.96	6.99	6.99	
TRC (mg/L)	20.05	20.05	20.05	20.05	
DO (mg/L)	6.4	5.3	5.1	4.7	
S/C (µmhos/cm)	48720	45540	47230	47230	
WQ STATION USED	1	1	1	1	
INITIALS	SJ	SJ	SJ	SJ	
<i>A. bahia</i> SALINITY ADJUSTMENT RECORD	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)					
SEA SALT (g)					
DATE:	9/11/07				
TIME:	1600				
INITIALS:	SJ				

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES

STUDY: 16234		CLIENT: BATTELLE				LOCATION: NEW BEDFORD				LAB CONTROL: HAMPTON ESTUARY					
		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	6.6	7.0	6.8	6.5	6.6	6.4	6.6	31	31	30	30	30	30	30
-001	A	5.5	5.5	4.9	5.3	6.5	5.9	6.4	33	28	30	30	30	30	30
-002	A	5.9	6.7	6.1	5.8	6.4	5.8	6.4	33	29	31	31	31	31	31
-003	A	6.9	6.0	6.1	6.5	6.7	6.1	6.5	33	28	31	31	30	30	30
-004	A														
NEW pH (SU)									NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.95	7.79	7.90	7.70	7.76	7.64	7.86	25	25	24	25	25	25	25
-001	A	6.79	6.96	6.89	6.82	6.96	6.94	6.97	25	25	26	25	25	25	25
-002	A	6.94	7.09	7.06	6.98	7.09	7.06	7.08	25	25	25	25	25	25	25
-003	A	7.03	7.05	7.05	6.93	7.00	7.02	7.15	25	25	25	25	25	25	25
-004	A								25						
INC TEMP:		25	26	26	26	26	26								
DATE:		9/12	9/13	9/14	9/15	9/16	9/17								
TIME:		1515	1605	1105	1315	1020	1215								
INIT:		AK	PA	LB	RAM	SJ	SJ								

WATER QUALITY METERS USED NEW WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		26	1	1	1	1	1	
Initials		PA	LB	RAM	SJ	SJ	SJ	N/A
Date	9/12/07	9/13	9/14	9/15	9/16	9/17	9/18	

**Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES**

STUDY: 16234		CLIENT: BATTELLE		LOCATION: NEW BEDFORD					LAB CONTROL: HAMPTON ESTUARY							
OLD SALINITY (ppt)									* OLD pH (SU)							
Conc	Rep	12	23	34	45	56	67	71	12	23	34	45	56	67	71	
Control	A	31	30	30	29	30	31		7.83	7.72	7.74	7.68	7.63	7.83		
-001	A	31	31	31	31	31	31		7.38	7.28	7.44	7.41	7.39	7.59		
-002	A	31	31	31	31	31	31		7.52	7.22	7.54	7.45	7.38	7.64		
-003	A	31	31	31	31	30	31		7.49	7.41	7.62	7.48	7.43	7.61		
-004	A															
OLD TEMPERATURE (°C)																
Conc	Rep	12	23	34	45	56	67	71								
Control	A	24	25	26	26	26	25									
-001	A	24	25	26	26	26	25									
-002	A	24	25	26	26	26	25									
-003	A	24	25	26	26	26	25									
-004	A															
INC TEMP:		26	26	26	26	26	26									
DATE:		9/14	9/15	9/16	9/17	9/18	9/19									
TIME:		1030	1215	0935	1140	0955	0830									
INITIALS:		LB	RAM	ST	ST	ST	RAM									

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each
- Test Temperature: 26 ± 1°C
- Salinity: 25 ± 2ppt
- Dissolved Oxygen: >4.3 mg/L
- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require ≥80% survival and average dry weight of ≥0.20 mg/organism in the control vessels.

*no old water qualities taken for day 1

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		20	22	1	1	1	2	1
Initials		LB	LB	RAM	ST	ST	ST	RAM
Date	9/12	9/13/07	9/14/07	9/15	9/16	9/17	9/18	9/19

**Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD**

STUDY: 16234			CLIENT: BATTELLE - New Bedford							
SPECIES: <i>A. bahia</i>			TEST: chronic renewal							
Sample	Day: 0		Day: 1		Day: 2 9/14/07		Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	1600	n/a	1600	n/a	1200	n/a	0	9/12/07	1500	AK
-001	↓	-001	↓	-001	↓	-001	1	9/13	1545	PA
-002	↓	-002	↓	-002	↓	-002	2	9/14	1105	UB
-003	↓	-003	↓	-003	↓	-003	3	9/15	1305	RAM
-004	↓	-004	↓	—	—	—	4	9/16	1015	SJ
							5	9/17	1210	SJ
							6	9/18	1145	SJ
Sample	Day: 3		Day: 4		Day: 5					
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	1200	n/a	1200	n/a	1200	n/a				
-001	↓	-001	↓	-001	↓	-001				
-002	↓	-002	↓	-002	↓	-002				
-003	↓	-003	↓	-003	↓	-003				
-004	—	—	—	—	—	—				
Sample	Day: 6									
	Volume Used (mL)	ESI Cube ID								
Lab Control	1200	n/a								
-001	↓	-001								
-002	↓	-002								
-003	↓	-003								
-004	—	—								

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY: 16391		CLIENT: Battelle				LOCATION: NEW BEDFORD				LAB CONTROL: HAMPTON ESTUARY				ORGANISM BATCH/LOT#			
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
Lab Control	A	5	5	4	4	4	4	4	4	6.2	6.3	6.1	6.3	6.8	6.0	6.3	
	B	5	5	5	5	5	5	5	5	6.0	6.3	6.1	6.2	6.8	5.8	6.3	
	C	5	5	5	5	5	5	5	5	5.9	6.3	6.1	6.1	6.7	5.9	6.1	
	D	5	5	5	5	5	5	5	5	6.0	6.3	6.0	6.1	6.7	5.8	6.1	
	E	5	5	5	5	5	5	5	5	5.9	6.3	6.0	6.2	6.7	5.8	6.2	
	F	5	5	5	5	5	5	5	5	6.0	6.3	6.0	6.2	6.6	5.8	6.2	
	G	5	5	5	5	5	5	5	5	6.1	6.3	6.0	6.3	6.6	5.9	6.1	
	H	5	5	5	5	5	5	5	5	6.2	6.3	6.1	6.0	6.6	5.8	6.2	
-001	A	5	5	5	5	5	5	5	5	5.6	6.3	5.9	6.2	6.6	5.7	6.2	
	B	5	5	5	5	5	5	5	5	5.4	6.1	5.8	6.1	6.5	5.5	6.1	
	C	5	5	5	5	5	5	5	5	5.6	6.1	5.8	6.1	6.6	5.6	6.1	
	D	5	5	5	5	5	5	5	5	5.5	6.1	5.7	6.1	6.6	5.7	6.1	
	E	5	5	5	5	5	5	5	5	4.9	6.1	5.4	5.9	6.5	5.6	6.0	
	F	5	5	5	5	5	5	5	5	5.1	6.0	5.6	5.9	6.4	5.5	5.8	
	G	5	5	5	5	5	5	5	5	5.3	5.9	5.6	5.9	6.4	5.6	5.9	
	H	5	5	5	5	5	5	5	5	5.5	5.9	5.6	5.9	6.4	5.7	5.8	
-002	A	5	5	5	5	5	5	5	5	4.8	6.0	5.7	5.9	6.4	5.1	6.2	
	B	5	5	5	5	5	5	5	5	5.7	6.0	5.6	5.9	6.3	5.4	6.0	
	C	5	5	5	5	5	5	5	5	5.6	6.0	5.7	5.9	6.3	5.6	5.9	
	D	5	5	5	5	5	5	5	5	5.6	6.0	5.7	5.8	6.3	5.6	5.7	
	E	5	5	5	5	5	5	5	5	5.6	5.9	5.7	5.8	6.4	5.7	5.9	
	F	5	5	5	5	5	5	5	5	5.7	5.6	5.6	5.8	6.3	5.4	5.9	
	G	5	5	5	5	4	4	4	4	5.8	5.7	5.6	5.7	6.3	5.6	5.9	
	H	5	5	5	5	5	5	5	5	5.9	5.9	5.7	5.7	6.4	5.5	5.9	
INC TEMP:		26	26	26	26	26	25	26	26								
DATE:		10/4/07	10/5	10/6	10/7	10/8	10/9	10/10	10/11								
TIME:		1330	1245	0940	0920	1125	1020	1320	1120								
INITIALS:		SJ	AK	RAM	SJ	SJ	RAM	PA	RAM								

**Americamysis bahia 7 DAY CHRONIC ASSAY
SURVIVAL & OLD WATER QUALITIES**

STUDY: 16391		CLIENT: Battelle		LOCATION: NEW BEDFORD		LAB CONTROL: HAMPTON ESTUARY		ORGANISM BATCH/LOT#									
		NUMBER OF SURVIVORS								OLD DISSOLVED OXYGEN (mg/L)							
SAMPLE	Rep	0	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
-003	A	5	5	5	5	5	5	5	5	5.7	5.5	5.4	5.7	6.5	5.6	5.6	
	B	5	5	5	5	5	5	5	5	5.8	5.6	5.3	5.6	6.4	5.5	5.7	
	C	5	5	5	5	5	5	5	5	5.7	5.7	5.3	5.6	6.6	5.5	5.6	
	D	5	5	5	5	5	5	5	5	5.5	5.7	5.4	5.5	6.2	5.7	5.7	
	E	5	5	5	5	5	5	5	5	5.7	5.8	5.5	5.4	6.3	5.7	5.9	
	F	5	5	5	5	5	5	5	5	5.6	5.9	5.3	5.7	6.3	5.4	5.8	
	G	5	5	5	5	5	5	5	5	5.7	5.8	5.4	5.7	6.3	5.5	5.8	
	H	5	5	5	5	5	5	5	5	5.3	5.8	5.4	5.4	6.5	5.6	5.6	
-004	A	5															
	B	5															
	C	5															
	D	5															
	E	5															
	F	5															
	G	5															
	H	5															
INC TEMP:	26		26	26	26	25	26	26									
DATE:	10/4/07		10/6	10/7	10/8	10/9	10/10	10/11									
TIME:	1330		0940	0920	1125	1020	1320	1120									
INITIALS:	SS		RAM	SS	SS	RAM	PA	RAM									

(F3)
SJ
10/4/07

**Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS**

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 110391				SPECIES: <i>A. bahia</i>				
CONC	REP	TARE WEIGHT (g)	^{mg} SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
Lab	A	0.20956	210.63					
	B	0.20876	210.53					
	C	0.21053	212.31					
	D	0.20715	209.27					
	E	0.20767	209.45					
	F	0.20701	208.97					
	G	0.20822	209.83					
	H	0.20780	209.69					
-001	A	0.20771	209.45					
	B	0.20979	211.85					
	C	0.20851	210.79					
	D	0.20908	211.26 211.12					
	E	0.20858	210.55					
	F	0.21266	214.93					
	G	0.20754	209.72					
	H	0.20927	211.33					
-002	A	0.20871	211.07					
	B	0.20768	209.76					
	C	0.20699	209.27					
	D	0.20804	210.07					
	E	0.20731	209.22					
	F	0.21024	212.45					
	G	0.20970	211.50					
	H	0.20917	211.74					
DATE		10/11/07	10/12/07					
TIME		1020	1530					
INITIALS		RAM	KAS					

**Americamysis bahia 7 DAY CHRONIC ASSAY
ORGANISM WEIGHTS**

CLIENT: BATTELLE - NEW BEDFORD				TEST DATES:				
STUDY #: 110391				SPECIES: A. bahia				
CONC	REP	TARE WEIGHT (g)	SHRIMP + FOIL (g)	NET WEIGHT (mg)	# SHRIMP DAY 0	MEAN WEIGHT (mg) DAY 0	# SHRIMP DAY 7	MEAN WEIGHT (mg) DAY 7
-003	A	0.20946	212.04					
	B	0.20799	211.31					
	C	0.20977	212.73					
	D	0.21031	213.21					
	E	0.20951	212.14					
	F	0.20918	212.21					
	G	0.21110	213.86					
	H	0.20807	211.08					
	A							
	B							
	C	End	0.03g	check blank				
	D							
	E							
	F							
	G							
	H							
	A							
	B							
	C							
	D							
	E							
	F							
	G							
	H							
DATE		10/11/07	10/12/07					
TIME		1020	1530					
INITIALS		RAM	KMB					

CETIS Test Summary

Page 1 of 2
Report Date: 12 Oct-07 4:11 PM
Link: 09-2103-8475

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.	
Test No:	11-8903-7394	Test Type:	Growth-Survival-Fec (7d)			Duration:	6d 21h
Start Date:	04 Oct-07 01:30 PM	Protocol:	EPA/821/R-02-014 (2002)			Species:	Americamysis bahia
Ending Date:	11 Oct-07 11:20 AM	Dil Water:	Not Applicable			Source:	ARO - Aquatic Research Organisms, N
Setup Date:	04 Oct-07 01:30 PM	Brine:	Not Applicable				
Sample No:	14-3480-7020	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	04 Oct-07 11:00 AM	Code:	13691-000			Project:	Ecological Risk Assessment
Receive Date:		Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	2h	Station:	WQ-TOX-Lab Control				
Sample No:	07-4978-4743	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 11:00 AM	Code:	16391-001			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	26h	Station:	WQ-TOX-001				
Sample No:	08-9714-4177	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 11:50 AM	Code:	16391-002			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	26h	Station:	WQ-TOX-002				
Sample No:	09-9353-6734	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 12:28 PM	Code:	16391-003			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	25h	Station:	WQ-TOX-003				
7d Proportion Survived Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
13691-000	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16391-003	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
16391-002	8	0.97500	0.80000	1.00000	0.02500	0.07071	7.25%
16391-001	8	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
Mean Dry Biomass-mg Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
13691-000	8	0.35200	0.21400	0.42400	0.02181	0.06169	17.53%
16391-003	8	0.41500	0.34800	0.45600	0.01242	0.03513	8.47%
16391-002	8	0.43125	0.36000	0.51400	0.01782	0.05039	11.69%
16391-001	8	0.57975	0.51600	0.66400	0.01699	0.04804	8.29%
Mean Dry Weight-mg Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
13691-000	8	0.35869	0.26750	0.42400	0.01602	0.04532	12.64%
16391-003	8	0.41500	0.34800	0.45600	0.01242	0.03513	8.47%
16391-002	8	0.44506	0.36000	0.55250	0.02347	0.06637	14.91%
16391-001	8	0.57975	0.51600	0.66400	0.01699	0.04804	8.29%

CETIS Test Summary

Report Date:

12 Oct-07 4:11 PM

Link:

09-2103-8475

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
13691-000	0.80000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16391-003	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
16391-002	1.00000	1.00000	1.00000	1.00000	1.00000	0.80000	1.00000	1.00000
16391-001	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
13691-000	0.21400	0.35400	0.35600	0.42400	0.35600	0.39200	0.34200	0.37800
16391-003	0.34800	0.41200	0.45600	0.40800	0.39400	0.45400	0.43600	0.41200
16391-002	0.47400	0.41600	0.45600	0.40600	0.38200	0.44200	0.36000	0.51400
16391-001	0.51600	0.66400	0.59200	0.58000	0.52600	0.60600	0.55200	0.60200

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
13691-000	0.26750	0.35400	0.35600	0.42400	0.35600	0.39200	0.34200	0.37800
16391-003	0.34800	0.41200	0.45600	0.40800	0.39400	0.45400	0.43600	0.41200
16391-002	0.47400	0.41600	0.45600	0.40600	0.38200	0.55250	0.36000	0.51400
16391-001	0.51600	0.66400	0.59200	0.58000	0.52600	0.60600	0.55200	0.60200

CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 12 Oct-07 4:19 PM
 Analysis: 08-3472-7466

Americamysis 7-d Survival, Growth and Fecundity Test EnviroSystems, Inc.

Test No: 11-8903-7394	Test Type: Growth-Survival-Fec (7d)	Duration: 6d 21h
Start Date: 04 Oct-07 01:30 PM	Protocol: EPA/821/R-02-014 (2002)	Species: Americamysis bahia
Ending Date: 11 Oct-07 11:20 AM	Dil Water: Not Applicable	Source: ARO - Aquatic Research Organisms, N
Setup Date: 04 Oct-07 01:30 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
2d Proportion Survived	Comparison	09-2103-8475	09-2103-8475	12 Oct-07 4:18 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Mann-Whitney U	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution

ANOVA Table

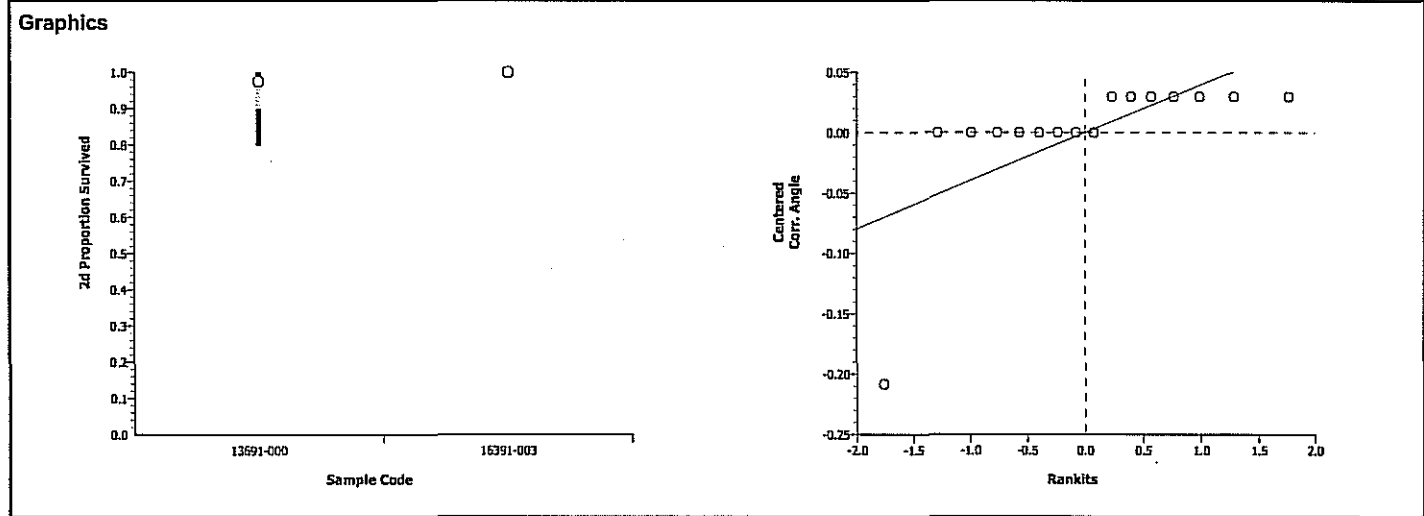
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect
Error	0.0496194	0.0035442	14			
Total	0.05316365	0.0070885	15			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)
13691-000		16391-003	28		0.6395	1	Non-Significant Effect

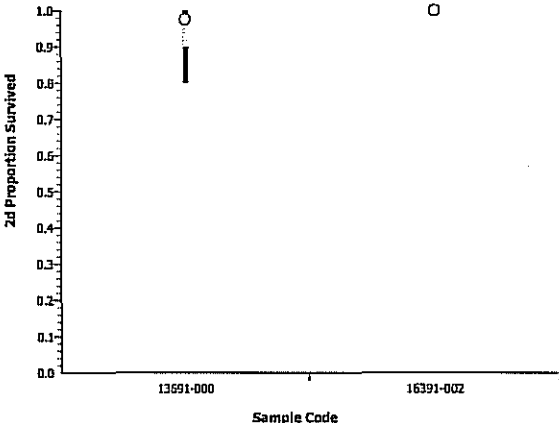
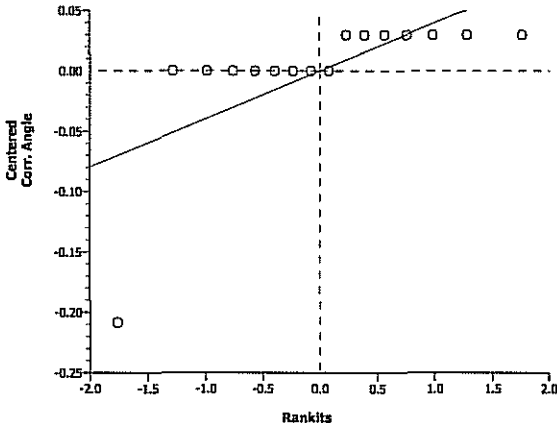
Data Summary

Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
16391-003	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019



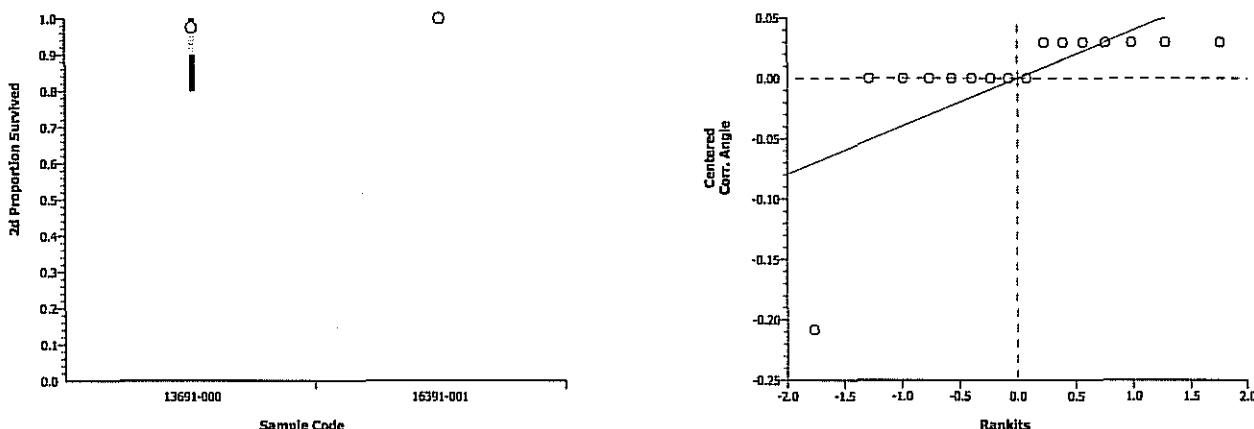
CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 12 Oct-07 4:19 PM
 Analysis: 03-7800-0423

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394	Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h			
Start Date:	04 Oct-07 01:30 PM	Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia			
Ending Date:	11 Oct-07 11:20 AM	Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	04 Oct-07 01:30 PM	Brine:	Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
2d Proportion Survived		Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:18 PM	CETISv1.026		
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U	C > T	Angular (Corrected)				N/A			
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances				
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect			
Error	0.0496194	0.0035442	14						
Total	0.05316365	0.0070885	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
13691-000		16391-002	28		0.6395	1	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
16391-002	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 12 Oct-07 4:19 PM
 Analysis: 08-2581-1011

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.													
Test No:	11-8903-7394		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 21h											
Start Date:	04 Oct-07 01:30 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia											
Ending Date:	11 Oct-07 11:20 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N											
Setup Date:	04 Oct-07 01:30 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
2d Proportion Survived		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:18 PM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp									
Mann-Whitney U		C > T	Angular (Corrected)					N/A											
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Modified Levene		1.00000		8.86159		0.33428		Equal Variances									
Distribution		Shapiro-Wilk W		0.46890		0.84420		0.00000		Non-normal Distribution									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0.0035442		0.0035442		1		1.00		0.33428		Non-Significant Effect							
Error		0.0496194		0.0035442		14													
Total		0.05316365		0.0070885		15													
Group Comparisons																			
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)						
13691-000			16391-001		28				0.6395		1		Non-Significant Effect						
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
13691-000		8		0.97500		0.80000		1.00000		0.07071		1.31552		1.10715		1.34528		0.08419	
16391-001		8		1.00000		1.00000		1.00000		0.00000		1.34528		1.34528		1.34528		0.00019	
Graphics																			
																			

CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 12 Oct-07 4:19 PM
 Analysis: 05-1240-9933

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.													
Test No:	11-8903-7394		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 21h										
Start Date:	04 Oct-07 01:30 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia										
Ending Date:	11 Oct-07 11:20 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N										
Setup Date:	04 Oct-07 01:30 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
2d Proportion Survived		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:18 PM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp									
Mann-Whitney U		C > T	Angular (Corrected)			N/A													
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Modified Levene		65535.00000		8.86159		0.00000		Unequal Variances									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0		0		1		65535.0		0.00000		Significant Effect							
Error		0		0		14													
Total		0		0		15													
Group Comparisons																			
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)						
16391-003			16391-001		32				0.4796		1		Non-Significant Effect						
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
16391-003		8		1.00000		1.00000		1.00000		0.00000		1.34528		1.34528		1.34528		0.00019	
16391-001		8		1.00000		1.00000		1.00000		0.00000		1.34528		1.34528		1.34528		0.00019	
Graphics																			

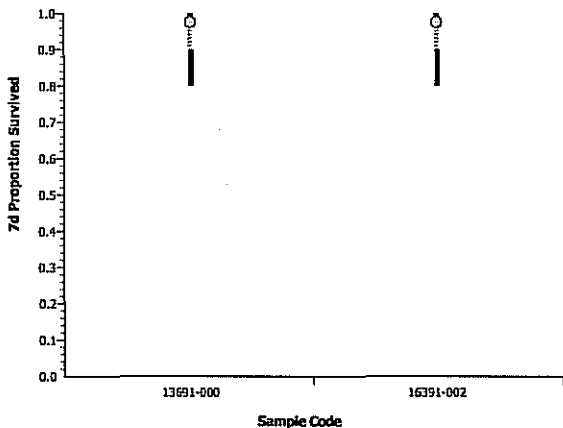
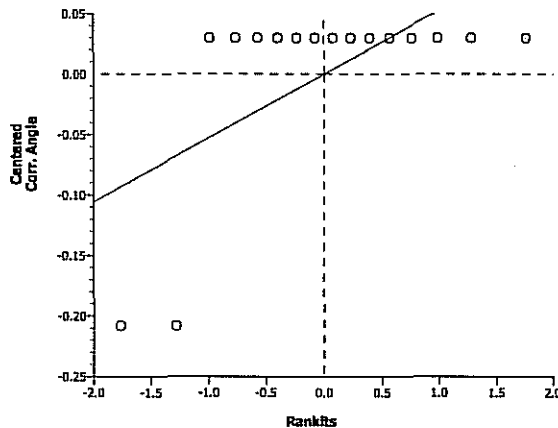
CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 12 Oct-07 4:06 PM
 Analysis: 05-6962-4030

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.					
Test No:	11-8903-7394		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 21h		
Start Date:	04 Oct-07 01:30 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia		
Ending Date:	11 Oct-07 11:20 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N		
Setup Date:	04 Oct-07 01:30 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
7d Proportion Survived		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:04 PM		CETISv1.026	
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Mann-Whitney U		C > T	Angular (Corrected)		N/A						
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Modified Levene		1.00000		8.86159		0.33428		Equal Variances	
Distribution		Shapiro-Wilk W		0.46890		0.84420		0.00000		Non-normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		0.0035442		0.0035442		1		1.00		0.33428	
Error		0.0496194		0.0035442		14					
Total		0.05316365		0.0070885		15					
Group Comparisons											
Sample		vs		Sample		Statistic		Critical		P Level	
13691-000				16391-003		28				0.6395	
										1	
										Non-Significant Effect	
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count		Mean		Minimum		Maximum		SD	
13691-000		8		0.97500		0.80000		1.00000		0.07071	
16391-003		8		1.00000		1.00000		1.00000		0.00000	
Graphics											

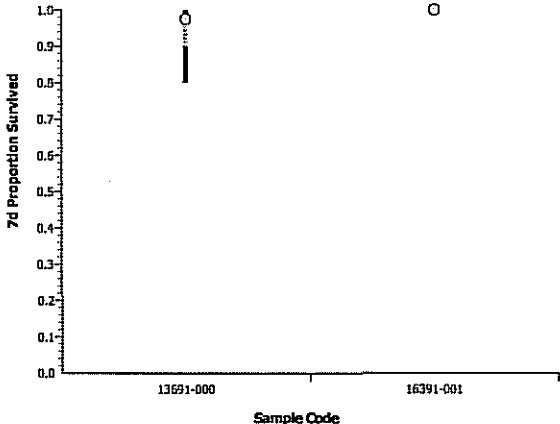
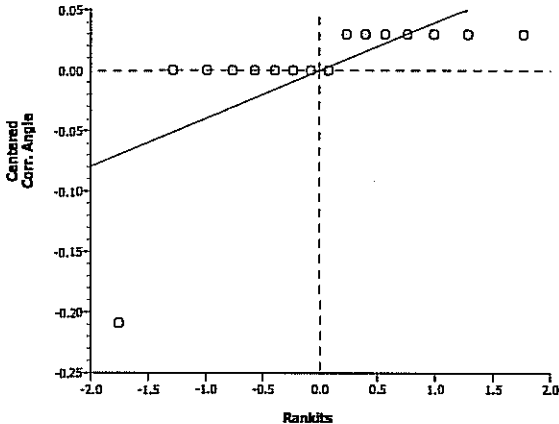
CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 12 Oct-07 4:06 PM
 Analysis: 03-3478-4727

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394	Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h			
Start Date:	04 Oct-07 01:30 PM	Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia			
Ending Date:	11 Oct-07 11:20 AM	Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	04 Oct-07 01:30 PM	Brine:	Not Applicable						
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
7d Proportion Survived	Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:04 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U	C > T	Angular (Corrected)				N/A			
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.00000	8.88539	1.00000	Equal Variances				
Distribution	Shapiro-Wilk W	0.39803	0.84420	0.00000	Non-normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0	0	1	0.00	1.00000	Non-Significant Effect			
Error	0.0992388	0.0070885	14						
Total	0.09923882	0.0070885	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
13691-000		16391-002	32		0.4796	2	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
16391-002	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
Graphics									
									

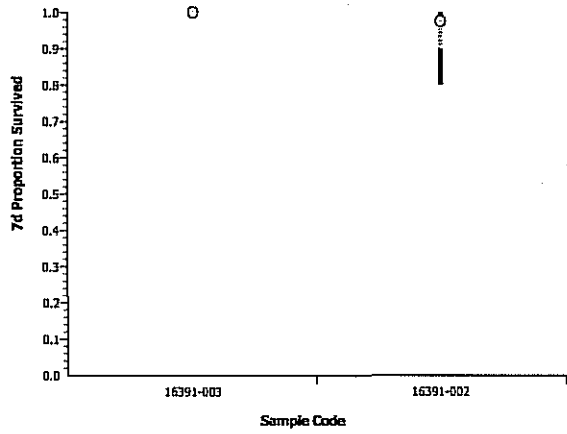
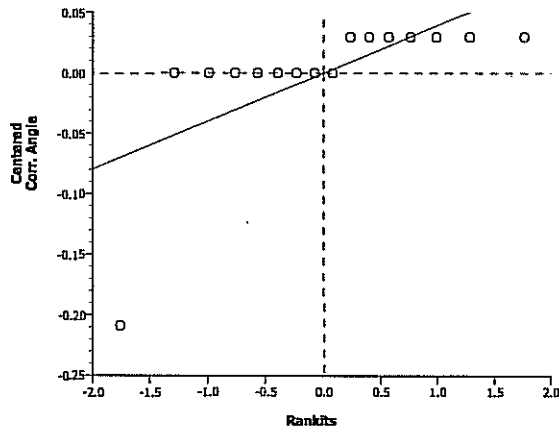
CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 12 Oct-07 4:06 PM
 Analysis: 10-6778-0258

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.				
Test No: 11-8903-7394		Test Type: Growth-Survival-Fec (7d)			Duration: 6d 21h					
Start Date: 04 Oct-07 01:30 PM		Protocol: EPA/821/R-02-014 (2002)			Species: Americamysis bahia					
Ending Date: 11 Oct-07 11:20 AM		Dil Water: Not Applicable			Source: ARO - Aquatic Research Organisms, N					
Setup Date: 04 Oct-07 01:30 PM		Brine: Not Applicable								
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed		Version		
7d Proportion Survived		Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:04 PM		CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U		C > T	Angular (Corrected)		N/A					
ANOVA Assumptions										
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)				
Variances		Modified Levene	1.00000	8.86159	0.33428	Equal Variances				
Distribution		Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution				
ANOVA Table										
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between		0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect			
Error		0.0496194	0.0035442	14						
Total		0.05316365	0.0070885	15						
Group Comparisons										
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)			
13691-000		16391-001	28		0.6395	1	Non-Significant Effect			
Data Summary										
Sample Code		Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
16391-001		8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
Graphics										
										

CETIS Analysis Detail

Comparisons: Page 5 of 5
 Report Date: 12 Oct-07 4:06 PM
 Analysis: 13-8429-1277

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394		Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h		
Start Date:	04 Oct-07 01:30 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia		
Ending Date:	11 Oct-07 11:20 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	04 Oct-07 01:30 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
7d Proportion Survived	Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:04 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Modified Levene	1.00000	8.86159	0.33428	Equal Variances				
Distribution	Shapiro-Wilk W	0.46890	0.84420	0.00000	Non-normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0035442	0.0035442	1	1.00	0.33428	Non-Significant Effect			
Error	0.0496194	0.0035442	14						
Total	0.05316365	0.0070885	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
16391-003		16391-002	36		0.3605	1	Non-Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	8	1.00000	1.00000	1.00000	0.00000	1.34528	1.34528	1.34528	0.00019
16391-002	8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
Graphics									
									

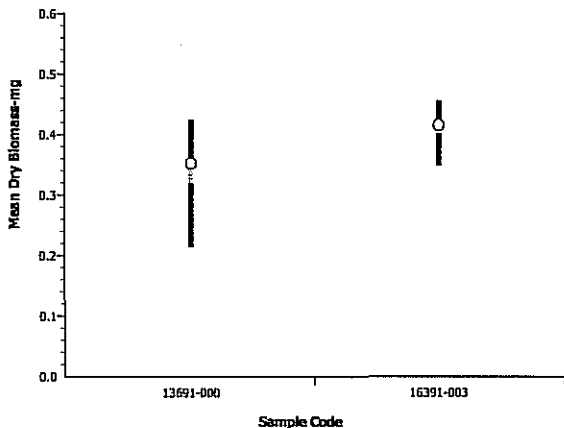
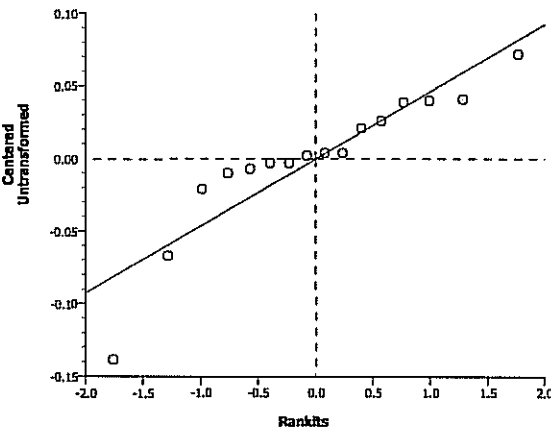
CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 12 Oct-07 4:06 PM
 Analysis: 07-2297-6030

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.													
Test No:	11-8903-7394		Test Type:		Growth-Survival-Fec (7d)		Duration:	6d 21h											
Start Date:	04 Oct-07 01:30 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Americamysis bahia											
Ending Date:	11 Oct-07 11:20 AM		Dil Water:		Not Applicable		Source:	ARO - Aquatic Research Organisms, N											
Setup Date:	04 Oct-07 01:30 PM		Brine:		Not Applicable														
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version									
7d Proportion Survived		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:04 PM		CETISv1.026									
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp									
Mann-Whitney U		C > T	Angular (Corrected)			N/A													
ANOVA Assumptions																			
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)									
Variances		Modified Levene		65535.00000		8.86159		0.00000		Unequal Variances									
ANOVA Table																			
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)							
Between		0		0		1		65535.0		0.00000		Significant Effect							
Error		0		0		14													
Total		0		0		15													
Group Comparisons																			
Sample		vs	Sample		Statistic		Critical		P Level		Ties		Decision(0.05)						
16391-003			16391-001		32				0.4796		1		Non-Significant Effect						
Data Summary																			
				Original Data				Transformed Data											
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum		SD	
16391-003		8		1.00000		1.00000		1.00000		0.00000		1.34528		1.34528		1.34528		0.00019	
16391-001		8		1.00000		1.00000		1.00000		0.00000		1.34528		1.34528		1.34528		0.00019	
Graphics																			

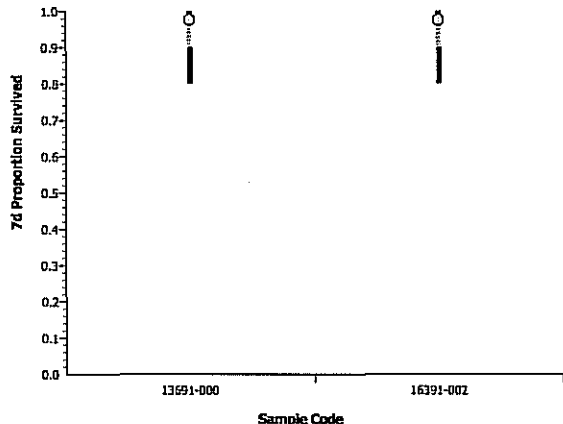
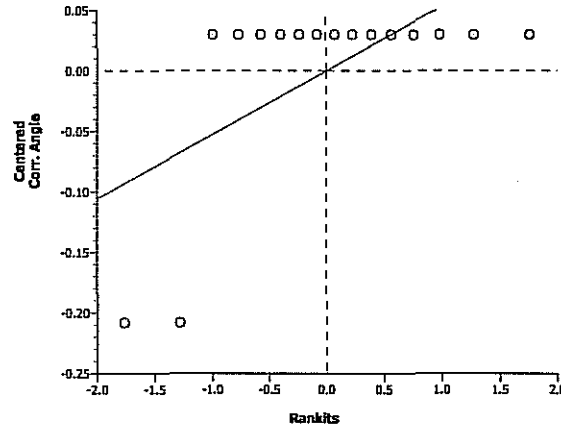
CETIS Analysis Detail

Comparisons: Page 1 of 10
 Report Date: 12 Oct-07 4:11 PM
 Analysis: 00-6385-3977

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394		Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h		
Start Date:	04 Oct-07 01:30 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia		
Ending Date:	11 Oct-07 11:20 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	04 Oct-07 01:30 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	3.08333	8.88539	0.16052	Equal Variances				
Distribution	Shapiro-Wilk W	0.86042	0.84420	0.01837	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0158760	0.0158760	1	6.30	0.02498	Significant Effect			
Error	0.0352800	0.0025200	14						
Total	0.05115604	0.0183960	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
13691-000		16391-003	-2.51	1.76131	0.9875	0.04421	Non-Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	8	0.35200	0.21400	0.42400	0.06169				
16391-003	8	0.41500	0.34800	0.45600	0.03513				
Graphics									
									

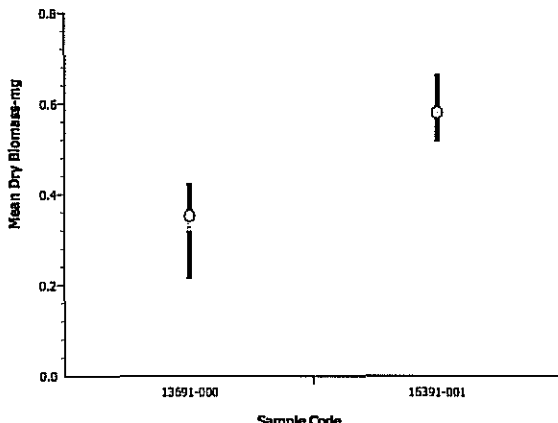
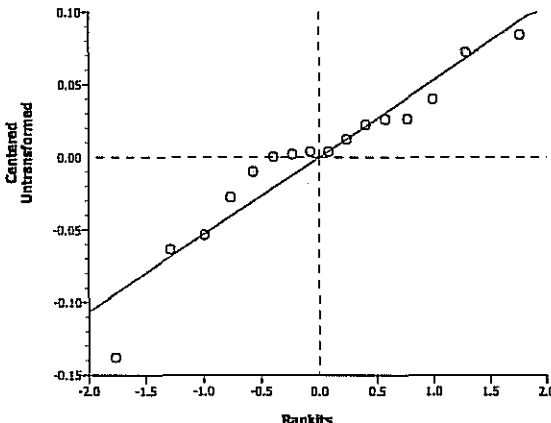
CETIS Analysis Detail

Comparisons: Page 4 of 10
 Report Date: 12 Oct-07 4:11 PM
 Analysis: 03-3478-4727

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.				
Test No:	11-8903-7394		Test Type:		Growth-Survival-Fec (7d)		Duration:		6d 21h	
Start Date:	04 Oct-07 01:30 PM		Protocol:		EPA/821/R-02-014 (2002)		Species:		Americamysis bahia	
Ending Date:	11 Oct-07 11:20 AM		Dil Water:		Not Applicable		Source:		ARO - Aquatic Research Organisms, N	
Setup Date:	04 Oct-07 01:30 PM		Brine:		Not Applicable					
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version
7d Proportion Survived		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:04 PM		CETISv1.026
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Mann-Whitney U		C > T	Angular (Corrected)				N/A			
ANOVA Assumptions										
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)				
Variances		Variance Ratio	1.00000	8.88539	1.00000	Equal Variances				
Distribution		Shapiro-Wilk W	0.39803	0.84420	0.00000	Non-normal Distribution				
ANOVA Table										
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between		0	0	1	0.00	1.00000	Non-Significant Effect			
Error		0.0992388	0.0070885	14						
Total		0.09923882	0.0070885	15						
Group Comparisons										
Sample		vs	Sample	Statistic	Critical	P Level	Ties	Decision(0.05)		
13691-000			16391-002	32		0.4796	2	Non-Significant Effect		
Data Summary										
Sample Code		Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
16391-002		8	0.97500	0.80000	1.00000	0.07071	1.31552	1.10715	1.34528	0.08419
Graphics										
										

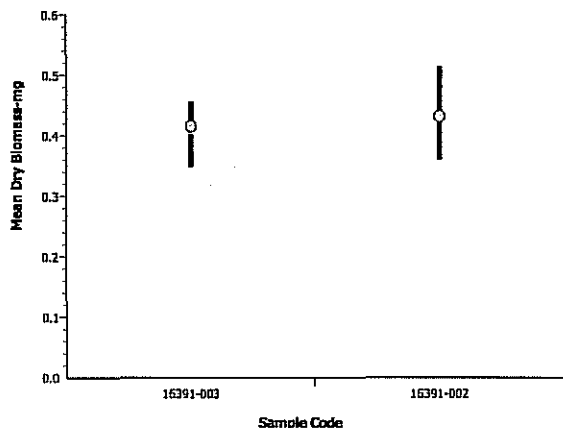
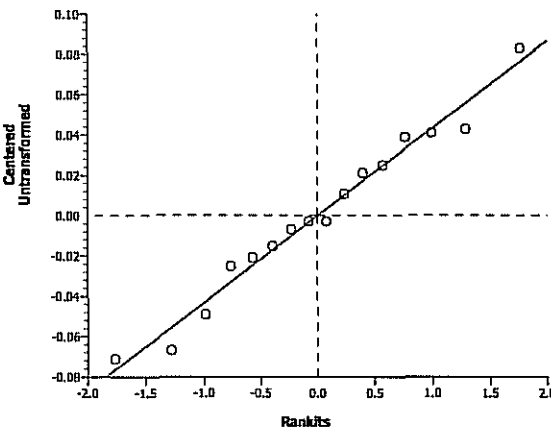
CETIS Analysis Detail

Comparisons: Page 2 of 10
 Report Date: 12 Oct-07 4:11 PM
 Analysis: 02-4273-5140

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394		Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h		
Start Date:	04 Oct-07 01:30 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia		
Ending Date:	11 Oct-07 11:20 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	04 Oct-07 01:30 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed				N/A			
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.64897	8.88539	0.52520	Equal Variances				
Distribution	Shapiro-Wilk W	0.92688	0.84420	0.21502	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.2074802	0.2074802	1	67.87	0.00000	Significant Effect			
Error	0.0427956	0.0030568	14						
Total	0.25027578	0.2105370	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
13691-000		16391-001	-8.2386	1.76131	1.0000	0.04869	Non-Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	8	0.35200	0.21400	0.42400	0.06169				
16391-001	8	0.57975	0.51600	0.66400	0.04804				
Graphics									
									

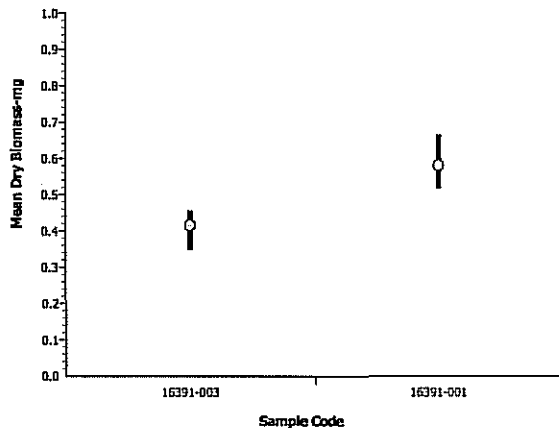
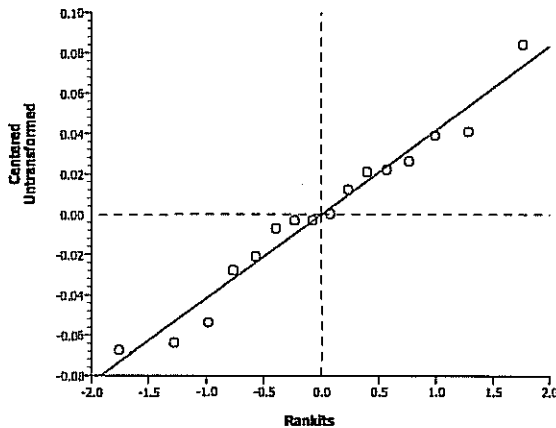
CETIS Analysis Detail

Comparisons: Page 3 of 10
 Report Date: 12 Oct-07 4:11 PM
 Analysis: 02-9233-6443

Americamysis 7-d Survival, Growth and Fecundity Test							EnviroSystems, Inc.							
Test No:	11-8903-7394		Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h							
Start Date:	04 Oct-07 01:30 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia							
Ending Date:	11 Oct-07 11:20 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N							
Setup Date:	04 Oct-07 01:30 PM		Brine:	Not Applicable										
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
Mean Dry Biomass-mg		Comparison		09-2103-8475		09-2103-8475		12 Oct-07 4:10 PM		CETISv1.026				
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp					
Equal Variance t		C > T	Untransformed		N/A									
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		2.05735		8.88539		0.36196		Equal Variances				
Distribution		Shapiro-Wilk W		0.97515		0.84420		0.88372		Normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		0.0010563		0.0010563		1		0.56		0.46672		Non-Significant Effect		
Error		0.0264155		0.0018868		14								
Total		0.02747174		0.0029431		15								
Group Comparisons														
Sample		vs	Sample		Statistic		Critical		P Level		MSD		Decision(0.05)	
16391-003			16391-002		-0.7482		1.76131		0.7666		0.03825		Non-Significant Effect	
Data Summary														
Sample Code		Count	Original Data				Transformed Data							
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
16391-003		8	0.41500	0.34800	0.45600	0.03513								
16391-002		8	0.43125	0.36000	0.51400	0.05039								
Graphics														
														

CETIS Analysis Detail

Comparisons: Page 8 of 10
 Report Date: 12 Oct-07 4:11 PM
 Analysis: 09-2309-0239

Americamysis 7-d Survival, Growth and Fecundity Test						EnviroSystems, Inc.			
Test No:	11-8903-7394		Test Type:	Growth-Survival-Fec (7d)		Duration:	6d 21h		
Start Date:	04 Oct-07 01:30 PM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Americamysis bahia		
Ending Date:	11 Oct-07 11:20 AM		Dil Water:	Not Applicable		Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	04 Oct-07 01:30 PM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Mean Dry Biomass-mg	Comparison		09-2103-8475	09-2103-8475	12 Oct-07 4:10 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Untransformed		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.86985	8.88539	0.42787	Equal Variances				
Distribution	Shapiro-Wilk W	0.96678	0.84420	0.74945	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.1085702	0.1085702	1	61.30	0.00000	Significant Effect			
Error	0.0247955	0.0017711	14						
Total	0.13336574	0.1103413	15						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16391-003		16391-001	-7.8295	1.76131	1.0000	0.03706	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	8	0.41500	0.34800	0.45600	0.03513				
16391-001	8	0.57975	0.51600	0.66400	0.04804				
Graphics									
									



Aquatic Research Organisms

DATA SHEET

Rec
10/4/07

I. Organism History

Species: AMEZICAMYSIS bahia

Source: Lab reared ☒ Hatchery reared ☐ Field collected ☐

Hatch date 9-27-07 Receipt date

Lot number 092707MS Strain

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ~30 ppt DO

pH 7.8 Hardness ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ☒ Phytoplankton ☐ Trout Chow ☒

Brine Shrimp ☒ Rotifers ☐ Other ENCAP. SHRIMP DIET

Prophylactic Treatments:

Comments:

IV. Shipping Information

Client: EST # of Organisms: 400+

Carrier: Date Shipped: 10-4-07

Biologist: Mark Rosenberg

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

**Arbacia punctulata Chronic Fertilization Assay
Water Quality and Gamete Preparation Data**

STUDY: <u>16391</u>	CLIENT: BATTELLE	LOCATION: New Bedford	DATE: <u>10/4/07</u> INITIALS: <u>LB</u>		
SALINITY ADJUSTMENT RECORD: _____ mL -001 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -002 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -003 + _____ g SALT					
SALINITY ADJUSTMENT RECORD: _____ mL -004 + _____ g SALT					
SALINITY ADJUSTED SAMPLE	D.O. (mg/L)	pH (SU)	SPEC COND (µmhos)	TEMP (°C)	SALINITY (ppt)
Lab Control	<u>6.7</u>	<u>7.92</u> 7.52	<u>38400</u>	<u>20</u>	<u>29</u>
-001	<u>7.1</u>	<u>7.52</u>	<u>41300</u>	<u>20</u>	<u>31</u>
-002	<u>7.6</u>	<u>7.67</u>	<u>41600</u>	<u>20</u>	<u>31</u>
-003	<u>7.5</u>	<u>7.72</u>	<u>41600</u>	<u>20</u>	<u>31</u>
-004					

METERS USED

DO meter # 19 DO probe # 12 pH meter # 1097 pH probe # 50 S/C meter # 330i S/C probe # 330i
SALINITY meter # 5/MIll-E

DATE & INITIALS FOR GAMETE PREPARATION: 10/4/07 LB
SPERM DILUTIONS:

HEMACYTOMETER COUNT, E: 110 X 10⁴ = SPM SOLUTION E = 1.1 x 10⁶
SPERM CONCENTRATIONS: SOLUTION E X 40 = SOLUTION A = 4.4 x 10⁹ SPM
SOLUTION E X 20 = SOLUTION B = 2.2 x 10⁹ SPM
SOLUTION E X 5 = SOLUTION C = 5.5 x 10⁴ SPM

FINAL COUNTS:

FINAL SPERM COUNT: 4.4 x 10⁷
FINAL EGG COUNT: 2400

TEST TIMES:

SPERM COLLECTED: 1115
EGGS COLLECTED: 1115
SPERM ADDED: 1140
EGGS ADDED: 1245
FIXATIVE ADDED: 1315

Arbacia punctulata Chronic Fertilization Assay

SAMPLE USE RECORD

STUDY: <u>16391</u>		CLIENT: Battelle - New Bedford
SPECIES: <i>A. punctulata</i>		
	Day: 0	
SAMPLE	Volume Used (mL)	ESI Cube ID
Lab Control	<u>100</u>	
-001		<u>- 001</u>
-002		<u>- 002</u>
-003		<u>- 003</u>
-004		
INITIALS:	<u>LB</u>	
TIME:	<u>1010</u>	
DATE:	10/3 <u>10/4/07</u>	

FERTILIZATION COUNTS

STUDY	CLIENT	LOCATION			DATE 10/4/07
	BATTELLE	New Bedford			INITIALS LB
SAMPLE	REPLICATE VIAL				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	FERT/TOTAL	
Lab Control	100/111	100/104	100/100	92/104	
-001	146/151	98/109	95/102	96/108	
-002	90/100	92/101	95/100	108/114	
-003	101/104	100/108	99/101	96/100	
-004					

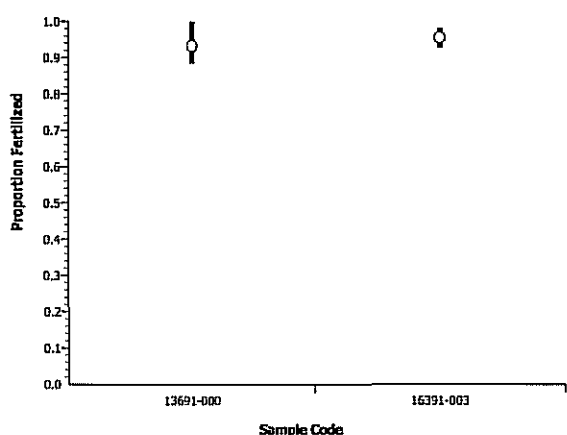
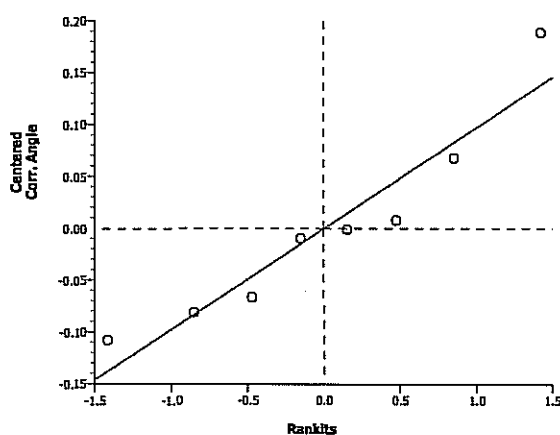
CETIS Test Summary

Page 1 of 1
Report Date: 04 Oct-07 4:09 PM
Link: 10-4800-1516

Arbacia Sperm Cell Fertilization Test				EnviroSystems, Inc.			
Test No:	04-3470-1502	Test Type:	Fertilization	Duration:	95m		
Start Date:	04 Oct-07 11:40 AM	Protocol:	EPA/821/R-02-014 (2002)	Species:	Arbacia punctulata		
Ending Date:	04 Oct-07 01:15 PM	Dil Water:	Not Applicable	Source:	In-House Culture		
Setup Date:	04 Oct-07 11:40 AM	Brine:	Not Applicable				
Sample No:	14-3480-7020	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	04 Oct-07 11:00 AM	Code:	13691-000	Project:	Ecological Risk Assessment		
Receive Date:		Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	40m	Station:	WQ-TOX-Lab Control				
Sample No:	07-4978-4743	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	03 Oct-07 11:00 AM	Code:	16391-001	Project:	Ecological Risk Assessment		
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	25h	Station:	WQ-TOX-001				
Sample No:	08-9714-4177	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	03 Oct-07 11:50 AM	Code:	16391-002	Project:	Ecological Risk Assessment		
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	24h	Station:	WQ-TOX-002				
Sample No:	09-9353-6734	Material:	Surface Water	Client:	Battelle Labs		
Sample Date:	03 Oct-07 12:28 PM	Code:	16391-003	Project:	Ecological Risk Assessment		
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	23h	Station:	WQ-TOX-003				
Proportion Fertilized Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
13691-000	4	0.93223	0.88462	1.00000	0.02577	0.05153	5.53%
16391-003	4	0.95474	0.92593	0.98020	0.01122	0.02243	2.35%
16391-002	4	0.92298	0.90000	0.95000	0.01106	0.02213	2.40%
16391-001	4	0.94679	0.88889	1.00000	0.02385	0.04770	5.04%
Proportion Fertilized Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
13691-000	0.90090	0.94340	1.00000	0.88462			
16391-003	0.95283	0.92593	0.98020	0.96000			
16391-002	0.90000	0.91089	0.95000	0.93103			
16391-001	0.96689	1.00000	0.93137	0.88889			

CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 04 Oct-07 4:09 PM
 Analysis: 10-1796-5557

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	04-3470-1502		Test Type:	Fertilization		Duration:	95m		
Start Date:	04 Oct-07 11:40 AM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	04 Oct-07 01:15 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	04 Oct-07 11:40 AM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		10-4800-1516	10-4800-1516	04 Oct-07 4:08 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	5.85974	47.46723	0.18049	Equal Variances				
Distribution	Shapiro-Wilk W	0.91366	0.74935	0.35640	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0017984	0.0017984	1	0.17	0.69356	Non-Significant Effect			
Error	0.0630851	0.0105142	6						
Total	0.06488351	0.0123126	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
13691-000		16391-003	-0.4136	1.94318	0.6532	0.14089	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	4	0.93223	0.88462	1.00000	0.05153	1.33153	1.22422	1.52078	0.13403
16391-003	4	0.95474	0.92593	0.98020	0.02243	1.36152	1.29515	1.42961	0.05537
Graphics									
									

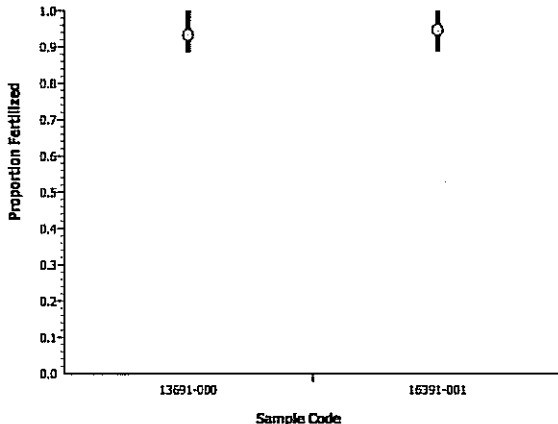
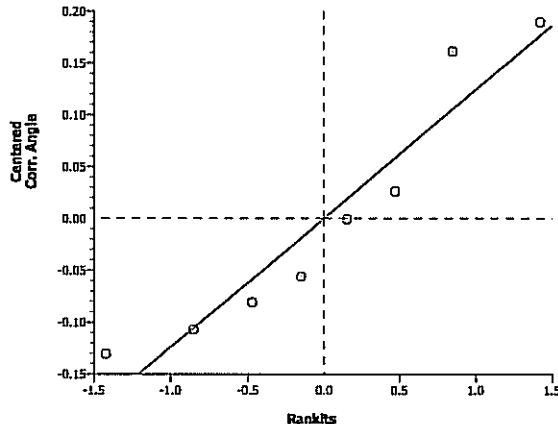
CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 04 Oct-07 4:09 PM
 Analysis: 14-3718-3627

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.												
Test No:	04-3470-1502		Test Type:		Fertilization		Duration:	95m										
Start Date:	04 Oct-07 11:40 AM		Protocol:		EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata										
Ending Date:	04 Oct-07 01:15 PM		Dil Water:		Not Applicable		Source:	In-House Culture										
Setup Date:	04 Oct-07 11:40 AM		Brine:		Not Applicable													
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version								
Proportion Fertilized		Comparison		10-4800-1516		10-4800-1516		04 Oct-07 4:08 PM		CETISv1.026								
Method		Alt H		Data Transform		Z		NOEL		LOEL		Toxic Units	ChV	MSDp				
Equal Variance t		C > T		Angular (Corrected)								N/A						
ANOVA Assumptions																		
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)								
Variances		Variance Ratio		9.89345		47.46723		0.09179		Equal Variances								
Distribution		Shapiro-Wilk W		0.91570		0.74935		0.37043		Normal Distribution								
ANOVA Table																		
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)						
Between		0.0031625		0.0031625		1		0.32		0.59224		Non-Significant Effect						
Error		0.0593356		0.0098893		6												
Total		0.06249808		0.0130517		7												
Group Comparisons																		
Sample		vs		Sample		Statistic		Critical		P Level		MSD		Decision(0.05)				
13691-000				16391-002		0.5655		1.94318		0.2961		0.13664		Non-Significant Effect				
Data Summary																		
								Original Data						Transformed Data				
Sample Code		Count		Mean		Minimum		Maximum		SD		Mean		Minimum		Maximum	SD	
13691-000		4		0.93223		0.88462		1.00000		0.05153		1.33153		1.22422		1.52078		0.13403
16391-002		4		0.92298		0.90000		0.95000		0.02213		1.29177		1.24905		1.34528		0.04261
Graphics																		
<div><div><p>Proportion Fertilized</p><p>Sample Code</p></div><div><p>Centred Corn. Anglia</p><p>Rankits</p></div></div>																		

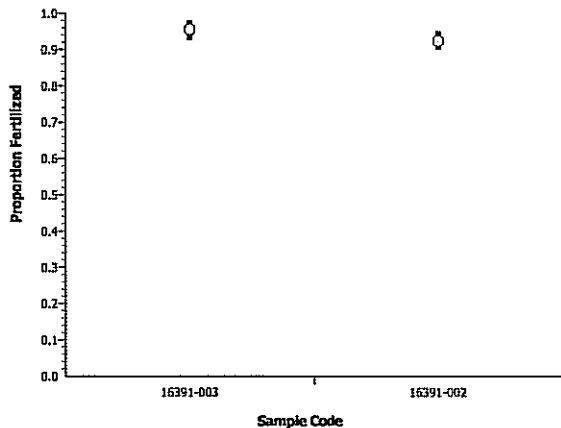
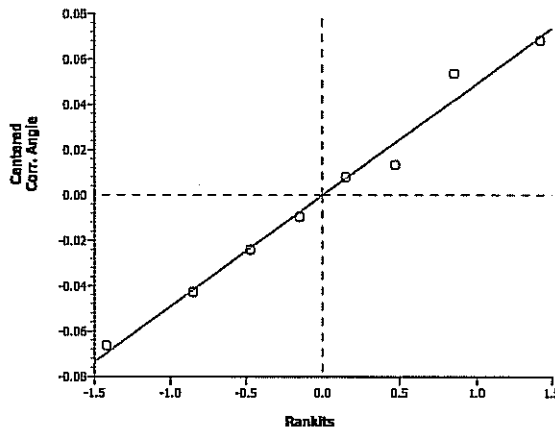
CETIS Analysis Detail

Comparisons: Page 5 of 5
 Report Date: 04 Oct-07 4:09 PM
 Analysis: 14-9782-5702

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	04-3470-1502		Test Type:	Fertilization		Duration:	95m		
Start Date:	04 Oct-07 11:40 AM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	04 Oct-07 01:15 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	04 Oct-07 11:40 AM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		10-4800-1516	10-4800-1516	04 Oct-07 4:09 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.14931	47.46723	0.91162	Equal Variances				
Distribution	Shapiro-Wilk W	0.89536	0.74935	0.25001	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0018383	0.0018383	1	0.11	0.75202	Non-Significant Effect			
Error	0.1007766	0.0167961	6						
Total	0.10261487	0.0186344	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
13691-000		16391-001	-0.3308	1.94318	0.6240	0.17807	Non-Significant Effect		
Data Summary									
Sample Code	Count	Original Data				Transformed Data			
		Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	4	0.93223	0.88462	1.00000	0.05153	1.33153	1.22422	1.52078	0.13403
16391-001	4	0.94679	0.88889	1.00000	0.04770	1.36185	1.23096	1.52289	0.12502
Graphics									
									

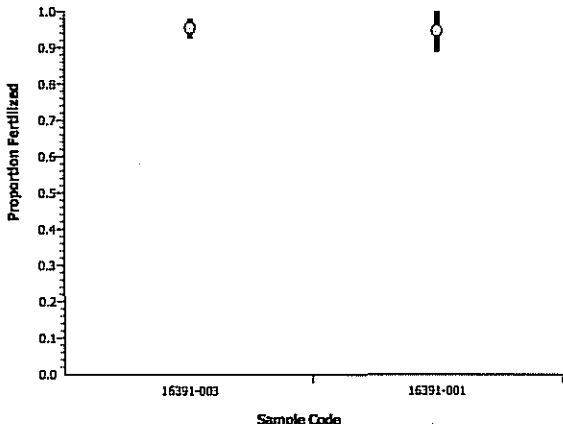
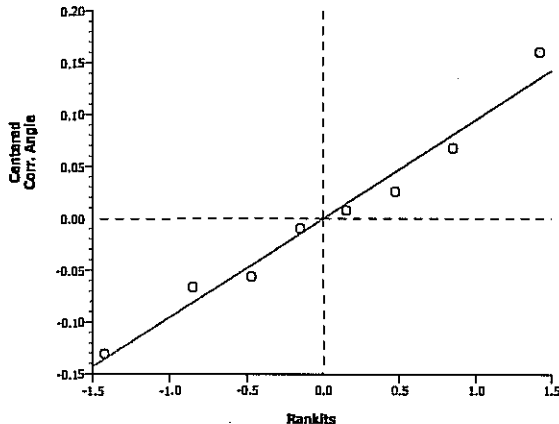
CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 04 Oct-07 4:09 PM
 Analysis: 12-7659-3935

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	04-3470-1502		Test Type:	Fertilization		Duration:	95m		
Start Date:	04 Oct-07 11:40 AM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	04 Oct-07 01:15 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	04 Oct-07 11:40 AM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		10-4800-1516	10-4800-1516	04 Oct-07 4:09 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	1.68838	47.46723	0.67758	Equal Variances				
Distribution	Shapiro-Wilk W	0.97238	0.74935	0.90329	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	0.0097305	0.0097305	1	3.99	0.09284	Non-Significant Effect			
Error	0.0146433	0.0024406	6						
Total	0.02437385	0.0121711	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16391-003		16391-002	1.99675	1.94318	0.0464	0.06788	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	4	0.95474	0.92593	0.98020	0.02243	1.36152	1.29515	1.42961	0.05537
16391-002	4	0.92298	0.90000	0.95000	0.02213	1.29177	1.24905	1.34528	0.04261
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 04 Oct-07 4:09 PM
 Analysis: 05-5428-8037

Arbacia Sperm Cell Fertilization Test						EnviroSystems, Inc.			
Test No:	04-3470-1502		Test Type:	Fertilization		Duration:	95m		
Start Date:	04 Oct-07 11:40 AM		Protocol:	EPA/821/R-02-014 (2002)		Species:	Arbacia punctulata		
Ending Date:	04 Oct-07 01:15 PM		Dil Water:	Not Applicable		Source:	In-House Culture		
Setup Date:	04 Oct-07 11:40 AM		Brine:	Not Applicable					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
Proportion Fertilized	Comparison		10-4800-1516	10-4800-1516	04 Oct-07 4:09 PM	CETISv1.026			
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t	C > T	Angular (Corrected)		N/A					
ANOVA Assumptions									
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)				
Variances	Variance Ratio	5.09849	47.46723	0.21401	Equal Variances				
Distribution	Shapiro-Wilk W	0.98055	0.74935	0.96309	Normal Distribution				
ANOVA Table									
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)			
Between	2.190E-07	2.190E-07	1	0.00	0.99629	Non-Significant Effect			
Error	0.0560843	0.0093474	6						
Total	0.05608453	0.0093476	7						
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16391-003		16391-001	-0.0048	1.94318	0.5019	0.13284	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	4	0.95474	0.92593	0.98020	0.02243	1.36152	1.29515	1.42961	0.05537
16391-001	4	0.94679	0.88889	1.00000	0.04770	1.36185	1.23096	1.52289	0.12502
Graphics									
									

***Champia parvula* Sexual Reproduction Test Quality Assurance Summary**

Client	ESI Ltd.	SRC Sample #	568, 569, 570
File #	MM478	Test Initiation Date	Oct 9/07
Analyst	M. Moody	Test Completion Date	Oct 16/07
Sample Identity	001, 002, 003 (also labeled Batelle)		

Test Type: Chronic, Definitive, Single-concentration (100%)

Test Organisms Species: *Champia parvula*, sexually mature male and female branches, in good health, males having sori with spermatia, females having trichogynes.

Test Conditions (additional information on following page)

Method: EPA-821-R-02-014 Method 1009.0, (Third edition, October 2002) static, non-renewal; 2-day effluent exposure followed by 5 to 7 day recovery period in control medium for cystocarp development.

Exposure/Dilution Medium: natural seawater collected at Pacific Environmental Science Centre, North Vancouver, B.C., filtered to 0.2µm and autoclaved before use, adjusted to salinity 30 ppt. and enriched with 10 ml/L Test Nutrient Solution, Table 1 of method cited.

Recovery Medium: natural seawater (same as for exposure medium), enriched with 10 ml/L Culture Nutrient Solution (method section 16.10.1.3).

Reference Toxicant Test

Method: EPA-821-R-02-014, Method 1009.0, static, non-renewal; 2-day exposure followed by 5 to 7 day recovery period in control medium for cystocarp development. See control performance and reference toxicant charts for additional information.

Test conditions: performed under same experimental conditions as effluent sample.

Compound: sodium dodecyl sulphate mg/L

Date of test: Oct 17/07	Historic value, warning limits $\pm 2SD$
IC ₅₀ (95 % CL) mg/L 1.17 (1.06 - 1.24)	1.30 (1.06 - 1.61)

Quality Control Data

Control mortality: no control mortality was observed in any control solution during observation periods.

Mean number of cystocarps per plant counted in this test (must be >10 to be acceptable).

mean control cystocarps per female	16.6
% survival in Control	100

Cystocarp Counts (mean per female branch)

Control, natural seawater	16.6
001	0
002	9.7
003	11.4
Signature: <i>M. Moody</i>	Date: <i>Nov 1/07</i>

Test Data Summary

Samples				SRC#	<u>568, 569, 570</u>
Identification/Type	<u>001, 002, 003 (also labeled Batelle)</u>			Analyst	<u>Mary Moody</u>
Date/Time Received	<u>Oct 9/07@ 0800</u>	Date Shipped	<u>Oct 4/07</u>	Temperature Upon Receipt (°C)	<u>8 with ice packs</u>
Test Initiation Date	<u>Oct 9/07</u>	Test Completion Date	<u>Oct 16/07</u>		

Organism Information

Species	<u>Champia parvula</u>	Appearance/Health of <i>Champia</i>	<u>excellent</u>
Source	<u>sexually mature male and female branches, obtained from USEPA, Hatfield Marine Science Center, Newport, Oregon, 1995</u>		
Females, Presence of Trichogynes	<u>yes</u>	Males, Presence of Sori with Spermatia	<u>yes</u>

Test Conditions

Test Method	<u>EPA-821-R-02-014, Method 1009.0</u>	Dilution/control water	<u>Natural Seawater</u>
Test Type	<u>Chronic definitive single concentration</u>		
Test Vessels (Exposure & Recovery)	<u>270 mL transparent polystyrene cups, transparent polystyrene lids</u>		
Exposure		Recovery	
Volume / Depth	<u>100 mL / 4.5 cm</u>	Volume / Depth	<u>200 mL / 7.3 cm</u>
Replicates/Conc.	<u>4</u>	No. of organisms (female/male)	<u>5/1</u>
Number and Concentrations of Test Solutions (%v/v)	<u>Controls: natural sea water Tests: 100</u>		
Chemicals added to control/dilution water	<u>Test Nutrients as described in method cited at 10 ml/L, analytical grade</u>		

Sample Treatment

D.O. before salinity adjustment (mg/L)	<u>see page 3</u>	D.O. at test start (mg/L)	<u>see page 3</u>
Aeration (duration/rate)	<u>none</u>	Filtration	<u>none</u>
Salinity Adjustment	<u>not required, all samples were at salinity of 30 ±2 ppt</u>		

Exposure Period (48 h)

Temperature, pH, D.O. and Salinity of test solutions and controls on following page

Photoperiod (L:D h)	<u>16:8</u>	Agitation of tests and controls	<u>gentle rotary shaking</u>
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Recovery Period (5-7 d)

Aeration gentle aeration supplied

Recovery Medium: natural sea water containing 10 ml/L Culture Nutrients (section 16.10.1.3 of cited method)

Submitted By: mmody **Date:** Nov 1/07

Water Quality Data

Sample Identification 001, 002, 003 (also labeled Batelle)

SRC# 568, 569, 570

INITIAL WATER QUALITY	SAMPLES at test start			TEST MEDIUM	RECOVERY MEDIUM
sample #	001	002	003		
Temperature (°C)	23	23	23	23	23
Dissolved Oxygen (mg/L)	7.8	7.8	7.8	7.8	7.8
pH	7.32	7.45	7.34	8.17	8.44
Salinity (ppt)	31	31	31	30	30
Description of sample	colorless	colorless	colorless		

Length of Recovery Period (days) 5

Water Quality Data during Exposure Period (0, 24, 48 hr)

Sample	Temperature (°C)			Dissolved Oxygen (mg/L)			pH			Salinity (ppt)		
	0	24	48	0	24	48	0	24	48	0	24	48
Control-NSW*	23	23	23	7.8	8.0	8.0	8.17	8.11	8.10	30	30	30
001	23	23	23	7.8	8.0	8.0	7.28	7.71	7.98	31	31	31
002	23	23	23	7.8	8.0	8.0	7.31	7.67	7.99	31	31	31
003	23	23	23	7.8	8.0	8.0	7.31	7.78	7.95	31	31	31

*Natural Sea Water

Appearance of branches after 48 hours exposure

Condition of female branches	Control NSW	001	002	003
description	normal*	pale and limp	normal	normal

* Branches red (no green areas), firm but flexible

Champia (female) Mortality at end of Recovery Period

Condition of female branches	Control NSW	001	002	003
# dead	0	0	0	0
% mortality	0	0	0	0
description	normal*	white with red tips	normal	normal

* Branches red (no green areas), firm but flexible

Initial/Date 22

22/1/07

RECOVERY PERIOD - TEMPERATURE MONITORING (initial daily entries)

Day 0	Day 1	Day 2	Day 3	Day 4	Day 5
23	23	23	23	23	23

Test Data

Sample Identification 001, 002, 003 (also labeled Batelle) Analyst Mary Moody SRC# 568, 569, 570

Champia Raw Data												
Date		Oct 9/07										
Cystocarps per plant								Mean	SD	Group mean	Comments	
										and SD		
Control	NSW	18	10	22	16	23		17.8	5.2	16.6	Healthy red colour	
		16	20	18	22	21		19.4	2.4	4.5	Normal growth	
		11	9	17	10	15		12.4	3.4			
		22	20	15	15	11		16.6	4.4			
SRC#	% V/V											
001	568	100	0	0	0	0	0	0.0	0.0	0.0	branches white with red tips	
		100	0	0	0	0	0	0.0	0.0	0.0		
		100	0	0	0	0	0	0.0	0.0			
		100	0	0	0	0	0	0.0	0.0			
002	569	100	5	16	6	11	5	8.6	4.8	9.7	Healthy red colour	
		100	5	5	6	7	10	6.6	2.1	4.4	Normal growth	
		100	12	9	15	11	7	10.8	3.0			
		100	6	11	18	18	10	12.6	5.3			
003	570	100	7	7	5	11	10	8.0	2.4	11.4	Healthy red colour	
		100	14	15	5	8	10	10.4	4.2	5.5	Normal growth	
		100	15	14	29	15	16	17.8	6.3			
		100	12	6	6	12	11	9.4	3.1			

SD: Standard Deviation

Submitted by:

M. Moody

Date:

Nov 1/07

CETIS Test Summary

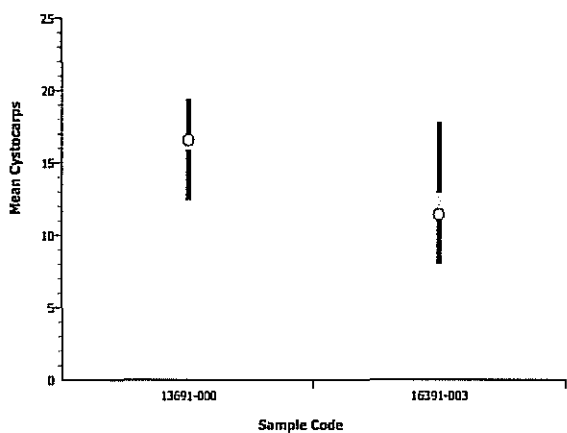
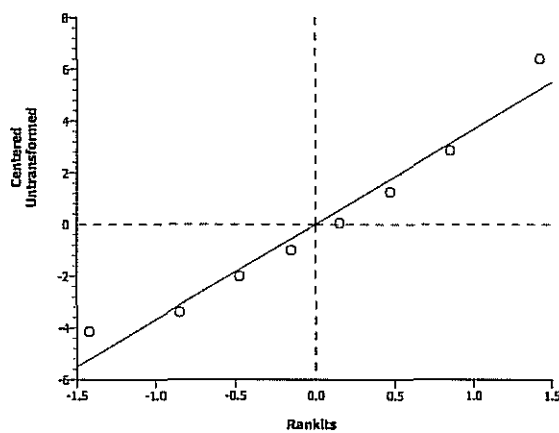
Report Date: 16 Oct-07 9:32 AM

Link: 04-5941-1906

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council	
Test No:	06-7702-5981	Test Type:	Champia			Duration:	5d 0h
Start Date:	07 Oct-07 12:00 PM	Protocol:	EPA/600/4-91/003 (1994)			Species:	Champia parvula
Ending Date:	12 Oct-07 12:00 PM	Dil Water:	Not Applicable			Source:	In-House Culture
Setup Date:	07 Oct-07 12:00 PM	Brine:	Not Applicable				
Sample No:	14-3480-7020	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	04 Oct-07 11:00 AM	Code:	13691-000			Project:	Ecological Risk Assessment
Receive Date:		Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	73h	Station:	WQ-TOX-Lab Control				
Sample No:	07-4978-4743	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 11:00 AM	Code:	16391-001			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 1h	Station:	WQ-TOX-001				
Sample No:	08-9714-4177	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 11:50 AM	Code:	16391-002			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	4d 0h	Station:	WQ-TOX-002				
Sample No:	09-9353-6734	Material:	Surface Water			Client:	Battelle Labs
Sample Date:	03 Oct-07 12:28 PM	Code:	16391-003			Project:	Ecological Risk Assessment
Receive Date:	03 Oct-07 04:00 PM	Source:	New Bedford Harbor Dredge Monitorin				
Sample Age:	96h	Station:	WQ-TOX-003				
Mean Cystocarps Summary							
Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
13691-000	4	16.55	12.4	19.4	1.4975	2.995	18.10%
16391-003	4	11.4	8	17.8	2.18937	4.37874	38.41%
16391-002	4	9.65	6.6	12.6	1.3048	2.6096	27.04%
16391-001	4	0	0	0	0	0	0.00%
Mean Cystocarps Detail							
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4			
13691-000	17.8	19.4	12.4	16.6			
16391-003	8	10.4	17.8	9.4			
16391-002	8.6	6.6	10.8	12.6			
16391-001	0	0	0	0			

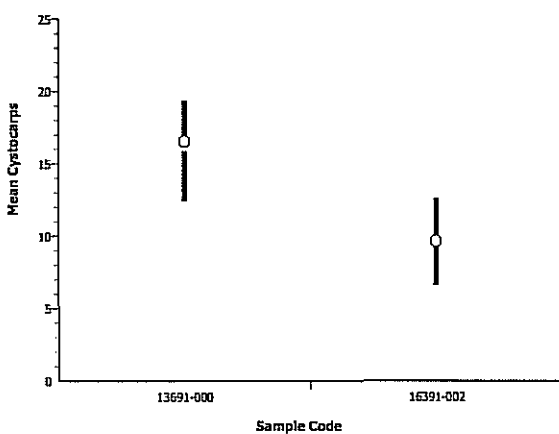
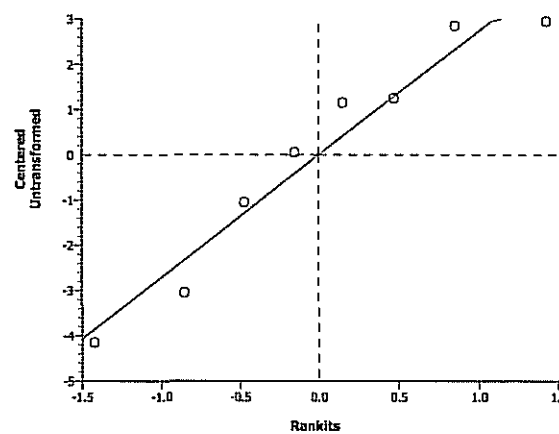
CETIS Analysis Detail

Comparisons: Page 1 of 5
 Report Date: 16 Oct-07 9:33 AM
 Analysis: 09-1668-6981

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council								
Test No:	06-7702-5981		Test Type:		Champia		Duration:	5d 0h						
Start Date:	07 Oct-07 12:00 PM		Protocol:		EPA/600/4-91/003 (1994)		Species:	Champia parvula						
Ending Date:	12 Oct-07 12:00 PM		Dil Water:		Not Applicable		Source:	In-House Culture						
Setup Date:	07 Oct-07 12:00 PM		Brine:		Not Applicable									
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version				
Mean Cystocarps		Comparison		04-5941-1906		04-5941-1906		16 Oct-07 9:31 AM		CETISv1.026				
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp					
Equal Variance t		C > T	Untransformed		N/A									
ANOVA Assumptions														
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)				
Variances		Variance Ratio		2.13750		47.46723		0.54871		Equal Variances				
Distribution		Shapiro-Wilk W		0.95676		0.74935		0.74701		Normal Distribution				
ANOVA Table														
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level		Decision(0.05)		
Between		53.045		53.045		1		3.77		0.10023		Non-Significant Effect		
Error		84.43		14.07167		6								
Total		137.474998		67.116665		7								
Group Comparisons														
Sample		vs	Sample		Statistic		Critical		P Level		MSD		Decision(0.05)	
13691-000			16391-003		1.94155		1.94318		0.0501		5.15431		Non-Significant Effect	
Data Summary														
				Original Data				Transformed Data						
Sample Code		Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD				
13691-000		4	16.55	12.4	19.4	2.99499								
16391-003		4	11.4	8	17.8	4.37874								
Graphics														
														

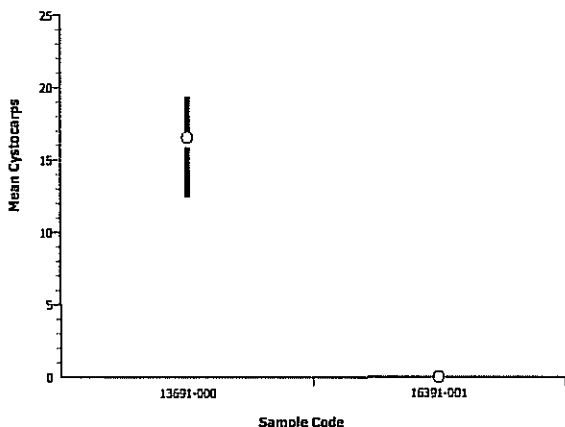
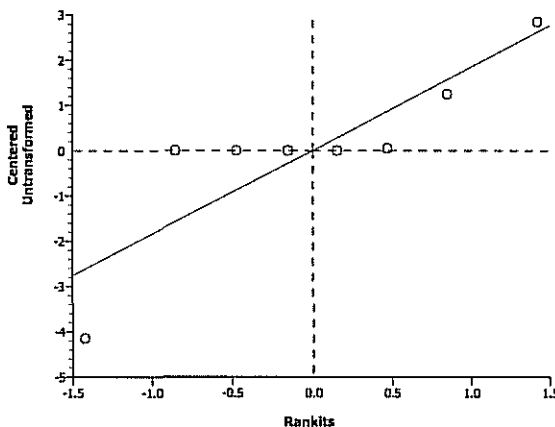
CETIS Analysis Detail

Comparisons: Page 3 of 5
 Report Date: 16 Oct-07 9:33 AM
 Analysis: 10-4382-4123

Champia parvula Red Macroalga Sexual Reproduction Test						Saskatchewan Research Council					
Test No:	06-7702-5981		Test Type:		Champia		Duration:	5d 0h			
Start Date:	07 Oct-07 12:00 PM		Protocol:		EPA/600/4-91/003 (1994)		Species:	Champia parvula			
Ending Date:	12 Oct-07 12:00 PM		Dil Water:		Not Applicable		Source:	In-House Culture			
Setup Date:	07 Oct-07 12:00 PM		Brine:		Not Applicable						
Endpoint		Analysis Type		Sample Link		Control Link		Date Analyzed		Version	
Mean Cystocarps		Comparison		04-5941-1906		04-5941-1906		16 Oct-07 9:31 AM		CETISv1.026	
Method		Alt H	Data Transform		Z	NOEL	LOEL	Toxic Units	ChV	MSDp	
Equal Variance t		C > T	Untransformed			N/A					
ANOVA Assumptions											
Attribute		Test		Statistic		Critical		P Level		Decision(0.01)	
Variances		Variance Ratio		1.31718		47.46723		0.82626		Equal Variances	
Distribution		Shapiro-Wilk W		0.92749		0.74935		0.46075		Normal Distribution	
ANOVA Table											
Source		Sum of Squares		Mean Square		DF		F Statistic		P Level	
Between		95.22		95.22		1		12.07		0.01324	
Error		47.34		7.89		6					
Total		142.560001		103.11000		7					
Group Comparisons											
Sample		vs	Sample		Statistic		Critical		P Level		MSD
13691-000			16391-002		3.47397		1.94318		0.0066		3.85955
											Decision(0.05)
											Significant Effect
Data Summary											
				Original Data				Transformed Data			
Sample Code		Count		Mean		Minimum		Maximum		SD	
13691-000		4		16.55		12.4		19.4		2.99499	
16391-002		4		9.65000		6.6		12.6		2.6096	
Graphics											
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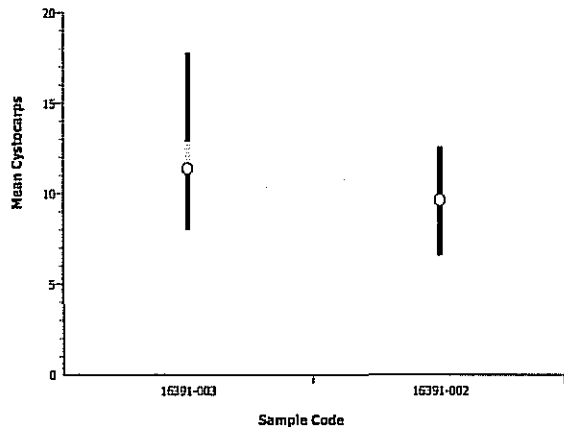
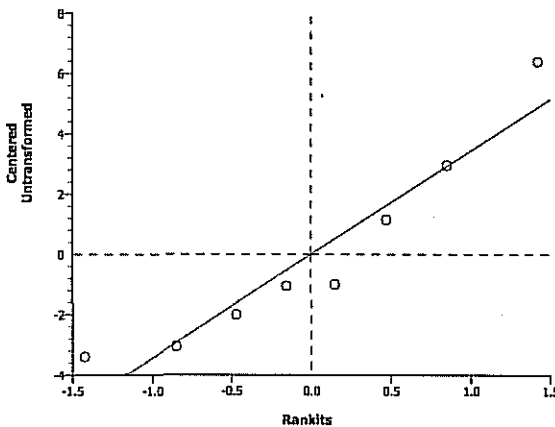
CETIS Analysis Detail

Comparisons: Page 5 of 5
 Report Date: 16 Oct-07 9:33 AM
 Analysis: 16-1554-3473

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	06-7702-5981		Test Type: Champia		Duration: 5d 0h				
Start Date:	07 Oct-07 12:00 PM		Protocol: EPA/600/4-91/003 (1994)		Species: Champia parvula				
Ending Date:	12 Oct-07 12:00 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	07 Oct-07 12:00 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		04-5941-1906	04-5941-1906	16 Oct-07 9:31 AM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Untransformed		N/A				
ANOVA Assumptions									
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)			
Variances		Modified Levene	4.27735	13.74502	0.08410	Equal Variances			
Distribution		Shapiro-Wilk W	0.80027	0.74935	0.03342	Normal Distribution			
ANOVA Table									
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)		
Between		547.805	547.805	1	122.14	0.00003	Significant Effect		
Error		26.91	4.485	6					
Total		574.714993	552.28999	7					
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
13691-000		16391-001	11.0518	1.94318	0.0000	2.90991	Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
13691-000	4	16.55	12.4	19.4	2.99499				
16391-001	4	0	0	0	0				
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 2 of 5
 Report Date: 16 Oct-07 9:33 AM
 Analysis: 10-2486-5564

Champia parvula Red Macroalga Sexual Reproduction Test					Saskatchewan Research Council				
Test No:	06-7702-5981		Test Type: Champia		Duration: 5d 0h				
Start Date:	07 Oct-07 12:00 PM		Protocol: EPA/600/4-91/003 (1994)		Species: Champia parvula				
Ending Date:	12 Oct-07 12:00 PM		Dil Water: Not Applicable		Source: In-House Culture				
Setup Date:	07 Oct-07 12:00 PM		Brine: Not Applicable						
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
Mean Cystocarps		Comparison		04-5941-1906	04-5941-1906	16 Oct-07 9:31 AM	CETISv1.026		
Method		Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t		C > T	Untransformed		N/A				
ANOVA Assumptions									
Attribute		Test	Statistic	Critical	P Level	Decision(0.01)			
Variances		Variance Ratio	2.81547	47.46723	0.41788	Equal Variances			
Distribution		Shapiro-Wilk W	0.90115	0.74935	0.28010	Normal Distribution			
ANOVA Table									
Source		Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)		
Between		6.125	6.125	1	0.47	0.51796	Non-Significant Effect		
Error		77.95	12.99167	6					
Total		84.0749969	19.116667	7					
Group Comparisons									
Sample	vs	Sample	Statistic	Critical	P Level	MSD	Decision(0.05)		
16391-003		16391-002	0.68663	1.94318	0.2590	4.95257	Non-Significant Effect		
Data Summary									
		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	4	11.4	8	17.8	4.37874				
16391-002	4	9.65000	6.6	12.6	2.6096				
Graphics									
									

CETIS Analysis Detail

Comparisons: Page 4 of 5
 Report Date: 16 Oct-07 9:33 AM
 Analysis: 11-5457-3384

Champia parvula Red Macroalga Sexual Reproduction Test	Saskatchewan Research Council
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Test No: 06-7702-5981	Test Type: Champia	Duration: 5d 0h
Start Date: 07 Oct-07 12:00 PM	Protocol: EPA/600/4-91/003 (1994)	Species: Champia parvula
Ending Date: 12 Oct-07 12:00 PM	Dil Water: Not Applicable	Source: In-House Culture
Setup Date: 07 Oct-07 12:00 PM	Brine: Not Applicable	

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Cystocarps	Comparison	04-5941-1906	04-5941-1906	16 Oct-07 9:31 AM	CETISv1.026

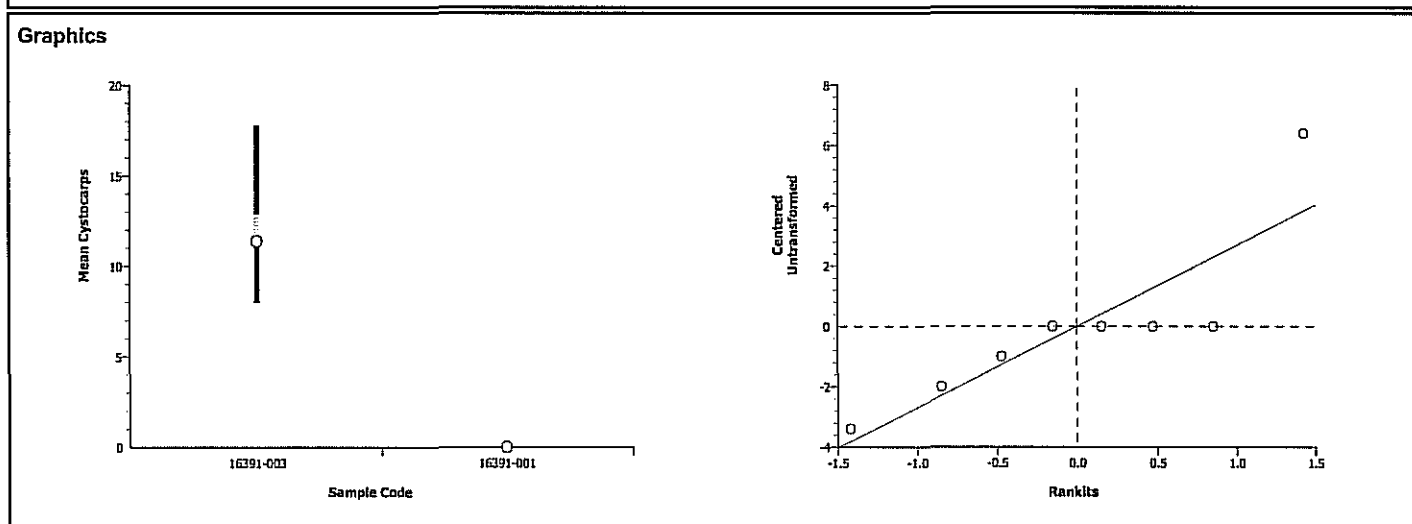
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Equal Variance t	C > T	Untransformed				N/A		

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	2.34154	13.74502	0.17684	Equal Variances
Distribution	Shapiro-Wilk W	0.78932	0.74935	0.02602	Normal Distribution

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	259.92	259.92	1	27.11	0.00200	Significant Effect
Error	57.52	9.586667	6			
Total	317.440014	269.50668	7			

Group Comparisons						
Sample	vs	Sample	Statistic	Critical	P Level	MSD
16391-003		16391-001	5.20698	1.94318	0.0010	4.25434
						Significant Effect

Data Summary		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
16391-003	4	11.4	8	17.8	4.37874				
16391-001	4	0	0	0	0				



SALTWATER ASSAYS

A. bahia, *A. punctulata*, *C. parvula*

STUDY: 16391	LOCATION: New Bedford Harbor				
CHEMISTRY					
	Lab Salt Control	-001	-002	-003	-004
AMMONIA	- 007	- 004	- 005	- 006	
AS RECEIVED WATER QUALITIES					
	Lab Salt Control	-001	-002	(ref.) (3) 041 101407 -003	-004
SALINITY (ppt)	31	31	30	31	
pH (SU)	8.00	7.51	7.66	7.72	
TRC (mg/L)	<0.05	<0.05	<0.05	<0.05	
DO (mg/L)	6.6	6.5	6.8	6.8	
S/C (µmhos/cm)	43500	41300	41200	41200	
WQ STATION USED	2	2	2	2	
INITIALS	RAM	RAM	RAM	RAM	
<i>A. bahia</i> SALINITY ADJUSTMENT RECORD					
	Lab Salt Control	-001	-002	-003	-004
SAMPLE (mLs)					
SEA SALT (g)					
DATE:					
TIME:					
INITIALS:					

Sample ID	ESI Cube ID
-001	-001
-002	-002
-003	-003
-004	-004

**Americamysis bahia 7 DAY CHRONIC ASSAY
NEW WATER QUALITIES**

STUDY: 16391		CLIENT: BATTELLE				LOCATION: NEW BEDFORD				LAB CONTROL: HAMPTON ESTUARY					
		NEW DISSOLVED OXYGEN (mg/L)							NEW SALINITY (ppt)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	6.7	5.5	6.7	6.5	6.9	6.6	6.7	29	29	30	29	29	31	31
-001	A	7.0	5.2	6.2	6.6	6.7	6.2	6.3	31	30	30	29	29	30	30
-002	A	7.5	5.2	6.2	6.5	6.7	6.3	6.4	30	30	30	29	29	30	29
-003	A	7.5	5.0	6.4	6.4	6.6	6.3	6.2	30	30	30	29	29	30	29
-004	A														
NEW pH (SU)									NEW TEMPERATURE (°C)						
CONC	REP	0	1	2	3	4	5	6	0	1	2	3	4	5	6
LAB	A	7.85	7.82	7.86	7.82	8.02	7.92	7.94	25	25	26	26	26	26	26
-001	A	7.58	7.48	7.51	7.65	7.62	7.52	7.49	25	25	26	26	26	26	26
-002	A	7.69	7.59	7.60	7.60	7.67	7.58	7.57	25	25	26	26	26	26	26
-003	A	7.73	7.57	7.52	7.50	7.62	7.46	7.52	25	25	26	26	26	26	26
-004	A														
INC TEMP:		26	26	26	26	26	26	26							
DATE:		10/4/07	10/5/07	10/6	10/7	10/8	10/9	10/10							
TIME:		1030	1310	0955	0945	1140	1035	1335							
INIT:		RAM	AK	RAM	ST	ST	RAM	PA							

**WATER QUALITY METERS USED
NEW WATER QUALITIES**

	0	1	2	3	4	5	6	7
Water Quality Station #								
Initials		AK	RAM	SS	SS	RAM	PA	
Date	10/4/07	10/5/07	10/6	10/7	10/8	10/9	10/10	

**Americamysis bahia 7 DAY CHRONIC ASSAY
OLD WATER QUALITIES**

STUDY: 16391		CLIENT: BATTELLE		LOCATION: NEW BEDFORD					LAB CONTROL: HAMPTON ESTUARY						
OLD SALINITY (ppt)									OLD pH (SU)						
Conc	Rep	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	25	30	29	29	28	31	31	7.97	7.78	7.90	7.87	7.80	7.91	7.88
-001	A	27	30	29	29	28	30	30	7.81	7.64	7.80	7.80	7.66	7.90	7.73
-002	A	27	30	29	29	31	30	30	7.85	7.70	7.79	7.79	7.71	7.98	7.74
-003	A	27	30	29	29	31	30	30	7.86	7.64	7.75	7.76	7.73	7.79	7.77
-004	A														
OLD TEMPERATURE (°C)															
Conc	Rep	1	2	3	4	5	6	7							
Control	A	25	26	26	26	25	26	26							
-001	A	26	26	26	26	25	26	26							
-002	A	26	26	26	26	25	26	26							
-003	A	26	26	26	26	25	26	26							
-004	A														
INC TEMP:		26	26	26	26	25	26	26							
DATE:		10/5	10/6	10/7	10/8	10/9	10/10	10/11							
TIME:		1230	0925	0920	1100	1000	1305	1110							
INITIALS:		AK	RAM	SJ	SJ	RAM	PA	RAM							

GENERAL NOTES - for additional information refer to SOP #1411 or EPA manual 600/4-91/003

- Test vessels will be 250 mL glass beakers containing a minimum of 150 mL of solution
- 8 replicates per site with 5 organisms each
- Test Temperature: $26 \pm 1^\circ\text{C}$
- Salinity: $25 \pm 2\text{ppt}$
- Dissolved Oxygen: $>4.3\text{ mg/L}$
- Photoperiod will be 16 hours light and 8 hours dark.
- Passing criteria require $\geq 80\%$ survival and average dry weight of $\geq 0.20\text{ mg/organism}$ in the control vessels.

WATER QUALITY METERS USED OLD WATER QUALITIES								
	0	1	2	3	4	5	6	7
Water Quality Station #		1	1	1	1	2	1	1
Initials		AK	RAM	SJ	SJ	RAM	PA	RAM
Date	10/4/07	10/5/07	10/6	10/7	10/8	10/9	10/10	10/11

**Americamysis bahia 7 DAY CHRONIC ASSAY
SAMPLE USE RECORD**

STUDY: 16391			CLIENT: BATTELLE - New Bedford							
SPECIES: <i>A. bahia</i>			TEST: chronic renewal							
Sample	Day: 0		Day: 1		Day: 2		Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	1,200	n/a	800	n/a	800	n/a	0	10/4/07	1000	RAM
-001	↓	-001	↓	-001	↓	-001	1	10/5	1300	AK
-002	↓	-002	↓	-002	↓	-002	2	10/6	0950	RAM
-003	↓	-003	↓	-003	↓	-003	3	10/7	0940	SJ
-004	↓		↓				4	10/8	1130	SJ
							5	10/9	1030	RAM
							6	10/10	1325	PA
Sample	Day: 3		Day: 4		Day: 5		Day	Date	Time	Init
	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID	Volume Used (mL)	ESI Cube ID				
Lab Control	800	n/a	800	n/a	800	n/a				
-001	↓	-001	↓	-001	↓	-001				
-002	↓	-002	↓	-002	↓	-002				
-003	↓	-003	↓	-003	↓	-003				
-004										
Sample	Day: 6		Day	Date	Time	Init				
	Volume Used (mL)	ESI Cube ID								
Lab Control	800	n/a								
-001	↓	-001								
-002	↓	-002								
-003	↓	-003								
-004										

SAMPLE RECEIPT RECORDESI STUDY NUMBER: 16150 CLIENT: BatelleSAMPLE RECEIPT:
DATE: 8/9/07 TIME: 1455 BY: SJDELIVERED VIA: ☐ FEDEX ☐ CLIENT ☒ ESI ☐ UPS ☐ OTHERLOGGED INTO LAB:
DATE: 8/9/07 TIME: 1455 BY: SJ**SAMPLE CONDITION:**CHAIN OF CUSTODY: ☒ YES ☐ NOCHAIN OF CUSTODY SIGNED: ☒ YES ☐ NOCHAIN OF CUSTODY COMPLETE: ☒ YES ☐ NOSAMPLE DATE: ☒ YES ☐ NOSAMPLE TIME RECORDED: ☒ YES ☐ NOSAMPLE TYPE IDENTIFIED: ☒ YES ☐ NOCUSTODY SEAL IN PLACE: ☒ YES ☐ NOSHIPPING CONTAINER INTACT: ☒ YES ☐ NOSAMPLE TEMPERATURE (AT ARRIVAL): 6 °CDOES CLIENT NEED NOTIFICATION OF TEMPERATURE?
☐ YES ☒ NOSAMPLE ARRIVED ON ICE: ☒ YES ☐ NO

COMMENTS:

See LOC

[illegible]

ORIGINAL

[illegible]

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 16234 CLIENT: Battelle

SAMPLE RECEIPT:
DATE: 9/11/07 TIME: 1360 BY: DG

DELIVERED VIA: ☐ FEDEX ☐ CLIENT ☒ ESI ☐ UPS ☐ OTHER

LOGGED INTO LAB:
DATE: 9/11/07 TIME: 1600 BY: SJ

SAMPLE CONDITION:

CHAIN OF CUSTODY: ☒ YES ☐ NO

CHAIN OF CUSTODY SIGNED: ☒ YES ☐ NO

CHAIN OF CUSTODY COMPLETE: ☒ YES ☐ NO

SAMPLE DATE: ☒ YES ☐ NO

SAMPLE TIME RECORDED: ☒ YES ☐ NO

SAMPLE TYPE IDENTIFIED: ☒ YES ☐ NO

CUSTODY SEAL IN PLACE: ☒ YES ☐ NA ☐ NO

SHIPPING CONTAINER INTACT: ☒ YES ☐ NO

SAMPLE TEMPERATURE (AT ARRIVAL): 5 °C

DOES CLIENT NEED NOTIFICATION OF TEMPERATURE?
☐ YES ☒ NO

SAMPLE ARRIVED ON ICE: ☒ YES ☐ NO

COMMENTS:

ORIGINAL

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 16391 CLIENT: Battelle

SAMPLE RECEIPT:

DATE: 10/3/07 TIME: 1432 BY: DG

DELIVERED VIA: ☐ FEDEX ☒ CLIENT ☐ ESI ☐ UPS ☐ OTHER

LOGGED INTO LAB:

DATE: 10/4/07 TIME: 0945 BY: RAM

SAMPLE CONDITION:

CHAIN OF CUSTODY: ☒ YES ☐ NO

CHAIN OF CUSTODY SIGNED: ☒ YES ☐ NO

CHAIN OF CUSTODY COMPLETE: ☒ YES ☐ NO

SAMPLE DATE: ☒ YES ☐ NO

SAMPLE TIME RECORDED: ☒ YES ☐ NO

SAMPLE TYPE IDENTIFIED: ☒ YES ☐ NO

CUSTODY SEAL IN PLACE: ☐ YES ☒ NA ☐ NO

SHIPPING CONTAINER INTACT: ☒ YES ☐ NO

SAMPLE TEMPERATURE (AT ARRIVAL): 6 °C

DOES CLIENT NEED NOTIFICATION OF TEMPERATURE?

☐ YES ☒ NO

SAMPLE ARRIVED ON ICE: ☒ YES ☐ NO

COMMENTS:

see COC

16391

Proj. No	Proj. Name
G606422-07WQ	New Bedford Harbor

SAMPLERS: Signature

Signature
Michael Walsh

ANALYSIS REQUESTED →
"NUMBER OF CONTAINERS"

[illegible]

Relinquished by:

Michael Walsh

Date/Time

10/3/2007 1341

Received by:

Jessica Hardy

Date/Time

10/3/07	1341
---------	------

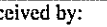
Relinquished by:

Jessica Hardy

Date/Time

10/3/07 | 1432

Received by:

Received by: 

Date/Time

10/3/07	1433
---------	------

Comments:

CHAIN OF CUSTODY DOCUMENTATION

Client: ENVROSYSYSTEMS INC	Contact: Ken Simons	Project Name: NB	Page 1 of 1
Report to: Ken Simons	Address: 1 Lafayette Rd	Project Number: 16391	
Invoice to: Jean Swanson	Address: Hampton, NH 03842	Project Manager: Ken Simons	
Voice: 603-926-3345	Fax: 603-923-3521	email: K.Simons@envirosys.com	P.O. No: Quote No:

[illegible]

Relinquished By: <i>Hellie Jackman</i>	Date: <i>10/4/07</i> Time: <i>1415</i>	Received By:	Date:	Time:
Relinquished By:	Date: Time:	Received at Lab By:	Date:	Time:

Comments:

Appendix E

Total Suspended Solids and Turbidity Analytical Data

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ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0708096

Report Date: August 27, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0708096

Project: New Bedford Harbor

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report were performed within holding time, and with appropriate quality control measures, except where noted. A summary of all state and federal accreditations is provided within this report. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Nancy a Rose Title: Project Manager Date: 8/27/07

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0708096**

Lab Sample ID	Client Sample ID
0708096-01	WQ-001-080907
0708096-02	WQ-002-080907
0708096-03	WQ-003-080907
0708096-04	WQ-004-080907

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-001-080907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **0708096-01**
Date Collected: **08/09/07**
Date Received: **08/09/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	10.5		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	4.60		0.400	1	08/11/07	NTU	180.1	NAR

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-002-080907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **0708096-02**
Date Collected: **08/09/07**
Date Received: **08/09/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	31.5		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	18.0		0.400	1	08/11/07	NTU	180.1	NAR

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-003-080907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **0708096-03**
Date Collected: **08/09/07**
Date Received: **08/09/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	40.7		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	24.0		0.400	1	08/11/07	NTU	180.1	NAR

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-004-080907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **0708096-04**
Date Collected: **08/09/07**
Date Received: **08/09/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	117		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	63.0		0.400	1	08/11/07	NTU	180.1	NAR

N/A - Not Applicable

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **WW081707B01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	08/16/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **WW081407B31**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	08/11/07	NTU	180.1	NAR

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **WW081707L01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	489	98	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

08/20/07 19:36

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708096**

Lab ID: **WW081407L02**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	20.0	100	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

08/20/07 19:46

DATE		TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION	PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS TURBIDITY	OTHER	ACIDIFIED	PRESERVED	Total Number of Containers
8/9/07	8:40		WQ-TSS-001-080907		MIDREF080907 - Reference 2NTU						✓					2
	9:15		WQ-TSS-002-080907		13 NTU 080907						↓					↓
	9:30		WQ-TSS-003-080907		20 NTU 080907											
	10:05		WQ-TSS-004-080907		55 NTU 080907											↓
	8:40		WQ-TUR-001-080907		MIDREF080907 - Reference 2NTU							X				2
	9:15		WQ-TUR-002-080907		13 NTU 080907							↓				↓
	9:30		WQ-TUR-003-080907		20 NTU 080907											
	10:05		WQ-TUR-004-080907		55 NTU 080907											↓

Relinquished by:

Signature

8/9/07 11:00

Received by:

Signature

8/9/07 12:15

Relinquished by:

Signature

8/9/07 12:15

Received by:

Signature

8/9/07 12:15

Comments:

Page 12/14

12/14

Sample Receipt Checklist

Page 1 of 1

Client: <u>BATTELLE</u>	Receipt Date: <u>8/9/07</u>
Project: <u>New Bedford Harbor</u>	Log-in Date: <u>8/10/07</u>
ETR #: <u>0708096</u>	Inspection by: <u>WR</u> Login by: <u>WR</u>

ALL SECTIONS BELOW MUST BE COMPLETED

Comments / Notes

<p>Were samples shipped? Yes, FedEx / UPS / Other: _____ No, WHG Courier pick-up / <u>Hand delivered</u></p>	<p>Sample storage refrigerator #: _____</p> <p>Sample storage freezer #: _____</p> <p>Cooler 2: <u>30/30</u> Cooler 3: _____</p> <p>Cooler 4: _____ Cooler 5: _____</p> <p>Cooler 6: _____ Cooler 7: _____</p> <p>More: _____</p>
<p>Is bill of lading retained? Yes, Tracking #: _____ No, Unavailable <u>NA</u></p>	
<p>Number of coolers received for this project delivery: <u>2</u></p>	
<p>Indicate cooler temperature upon opening (if multiple coolers, record <u>all</u> temps): <u>Note: If all coolers are 2-6°C, use one checklist, if NOT, use separate checklists and note all samples received above 6°C.</u></p>	
<p><u>Cooler 1:</u> Temperature(s) taken from: <u>30</u> IR Gun, <u>30</u> Temp. Blank, / NA</p>	
<p>Were samples received on ice? <u>Yes</u> / No</p>	
<p>Chain-of-Custody present? <u>Yes</u> / No Complete? <u>Yes</u> / No</p>	
<p>Custody seals present on Cooler? Yes / <u>No</u> on Bottles? Yes / <u>No</u> Intact? Yes / No / <u>NA</u></p>	
<p><u>Note: Affix custody seals to back of this page.</u></p>	
<p>Were sample containers intact? <u>Yes</u> / No If No, list samples: →</p>	
<p>Did VOA/VPH waters contain headspace (>5mm)? Yes / No <u>NA</u> If Yes, list samples: →</p>	
<p>Were 5035 VOA soils, or VPH soils, covered with MeOH? Yes / No / <u>NA</u> If No, list samples: →</p>	
<p>Was a sufficient amount of sample received for each test indicated on the COC? <u>Yes</u> / No If No, list samples: →</p>	
<p>If chemical preservation is appropriate - Were samples field preserved? Yes / No / <u>NA</u> <input type="checkbox"/> C=HCl <input type="checkbox"/> M=MeOH <input type="checkbox"/> S=H₂SO₄ <input type="checkbox"/> H=NaOH <input type="checkbox"/> N=HNO₃ <input type="checkbox"/> Other: _____ <input type="checkbox"/> U= Unknown</p>	<p>Chemical preservation OK for ALL samples? Yes / No / <u>NA</u></p>
<p>Preservation (pH) verified at lab for <u>EVERY</u> bottle? (<u>Not</u> VOA / VPH / Sulfide) YES: <2 or >12 (CN) or NO <u>NA</u> If No, why?:</p>	<p>If No, list samples below:</p>
<p>Were samples received within hold time? <u>Yes</u> / No If No, list samples: →</p>	
<p>Discrepancy between samples rec'd & COC? Yes / <u>No</u> If Yes, list samples: →</p>	
<p>Was the Project Manager notified of any other problems? Yes / No / NA</p>	
<p>Project Manager Acknowledgement: <u>WR</u> Date: <u>8/13/07</u></p>	<p>Please use back for any additional notes!</p>

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH3; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID : MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; : 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Portable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0708155

Report Date: August 27, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0708155

Project: New Bedford Harbor

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report were performed within holding time, and with appropriate quality control measures, except where noted. A summary of all state and federal accreditations is provided within this report. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Nancy J. Rose Title: Project Manager Date: 8/27/07

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0708155**

Lab Sample ID	Client Sample ID
0708155-01	WQ-TSS/TUR-001-081607
0708155-02	WQ-TSS/TUR-002-081607
0708155-03	WQ-TSS/TUR-003-081607
0708155-04	WQ-TSS/TUR-004-081607
0708155-05	WQ-TSS/TUR-005-081607

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-081607**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **0708155-01**
Date Collected: **08/16/07**
Date Received: **08/16/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	18.7		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	8.65		0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-002-081607**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **0708155-02**
Date Collected: **08/16/07**
Date Received: **08/16/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	26.0		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	14.7		0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-003-081607**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **0708155-03**
Date Collected: **08/16/07**
Date Received: **08/16/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	24.5		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	12.4		0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-004-081607**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **0708155-04**
Date Collected: **08/16/07**
Date Received: **08/16/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	10.5		1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	5.14		0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-005-081607**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **0708155-05**
Date Collected: **08/16/07**
Date Received: **08/16/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	08/16/07	mg/L	160.2	JAD
Turbidity - 180.1	0.400	U	0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**
Lab ID: **WW081607B23**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	08/16/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708155**

Lab ID: **WW081707B01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	08/16/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: Battelle
Project: New Bedford Harbor
Case: N/A SDG: N/A
Client ID: Laboratory Control Sample
Matrix: Water

Lab Code: MA00030
ETR: 0708155
Lab ID: WW081607L07
Date Collected: N/A
Date Received: N/A

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	19.9	100	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

08/20/07 19:37

Laboratory Control Sample Inorganics



Client: Battelle
Project: New Bedford Harbor
Case: N/A SDG: N/A
Client ID: Laboratory Control Sample
Matrix: Water

Lab Code: MA00030
ETR: 0708155

Lab ID: WW081707L01
Date Collected: N/A
Date Received: N/A

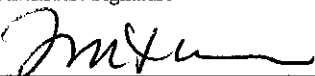
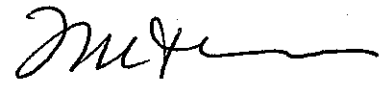

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	489	98	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

08/20/07 19:37

07 08155

Proj. No 6606422		Proj. Name New Bedford Harbor WQ													
SAMPLERS: Signature 				ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"		PEST	PCB	TPH FINGERPRINT	PAH	VOC TSS TUR	METALS	OTHER	ACIDIFIED	PRESERVED	Total Number of Containers
DATE	TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION											
8/16/07	11:10	WQ-TSS/TUR-001-081607		WOOD ST BRIDGE REFERENCE						✓					2
	11:40	WQ-TSS/TUR-002-081607		200' from Debris Removal						↓					↓
	12:00	WQ-TSS/TUR-003-081607		Dredge Area G Boundary						↓					↓
	12:15	WQ-TSS/TUR-004-081607		300' S. of Dredge Area G Boundary						↓					↓
	11:13	WQ-TSS/TUR-005-081607	-EB	Equip Blank						↓					↓
Relinquished by:				Date/Time		Received by:				Date/Time					
				8/16/07 13:05						8/16/07 14:00					
Relinquished by:				Date/Time		Received by:				Date/Time					
Comments:															

Sample Receipt Checklist

Page 1 of _____

Client: <u>BADUX</u>	Receipt Date: <u>8/16/07</u>
Project: <u>New Bedford Harbor</u>	Log-in Date: <u>8/16/07</u>
ETR #: <u>0708155</u>	Inspection by: <u>KMR</u> Login by: <u>KMR</u>

ALL SECTIONS BELOW MUST BE COMPLETED

Comments / Notes

Were samples shipped? Yes, FedEx / UPS / Other: <u>No</u> , WHG Courier pick-up / <u>Hand delivered</u>	Sample storage refrigerator #: _____
Is bill of lading retained? Yes, Tracking #: _____ No, Unavailable / <u>NA</u>	Sample storage freezer #: _____
Number of coolers received for this project delivery: <u>1</u>	
Indicate cooler temperature upon opening (if multiple coolers, record <u>all</u> temps): Note: If <u>all</u> coolers are 2-6°C, use one checklist, if NOT, use separate checklists and note <u>all</u> samples received <u>above</u> 6°C. Cooler 1: Temperature(s) taken from: <u>10</u> IR Gun, <u>6</u> Temp. Blank, / NA	Cooler 2: _____ Cooler 3: _____ Cooler 4: _____ Cooler 5: _____ Cooler 6: _____ Cooler 7: _____ More: _____
Were samples received on ice? <u>Yes</u> / No	
Chain-of-Custody present? <u>Yes</u> / No Complete? <u>Yes</u> / No	
Custody seals present on Cooler? <u>Yes</u> / No on Bottles? Yes / <u>No</u> Intact? <u>Yes</u> / No / NA Note: Affix custody seals to back of this page.	
Were sample containers intact? <u>Yes</u> / No If No, list samples: →	
Did VOA/VPH waters contain headspace (>5mm)? Yes / No / <u>NA</u> If Yes, list samples: →	
Were 5035 VOA soils, or VPH soils, covered with MeOH? Yes / No / <u>NA</u> If No, list samples: →	
Was a sufficient amount of sample received for each test indicated on the COC? <u>Yes</u> / No If No, list samples: →	
If chemical preservation is appropriate - Were samples field preserved? Yes / No / <u>NA</u> <input type="checkbox"/> C=HCl <input type="checkbox"/> M=MeOH <input type="checkbox"/> S=H ₂ SO ₄ <input type="checkbox"/> H=NaOH <input type="checkbox"/> N=HNO ₃ <input type="checkbox"/> Other: _____ <input type="checkbox"/> U=Unknown	Chemical preservation OK for ALL samples? Yes / No / <u>NA</u> If No, list samples below:
Preservation (pH) verified at lab for EVERY bottle? (Not: VOA / VPH / Sulfide) YES: <2 or >12 (CN) or NO <u>NA</u> If No, why?:	
Were samples received within hold time? <u>Yes</u> / No If No, list samples: →	
Discrepancy between samples rec'd & COC? Yes / <u>No</u> If Yes, list samples: →	
Was the Project Manager notified of any other problems? Yes / No / NA	
Project Manager Acknowledgement: <u>NA Rose</u> Date: <u>8/16/07</u>	Please use back for any additional notes!

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH₃; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624)

Massachusetts Department of Environmental Protection Certificate/Lab ID : M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID : 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID : MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; : 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Portable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0708232

Report Date: September 17, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0708232

Project: New Bedford Harbor

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report were performed within holding time, and with appropriate quality control measures, except where noted. A summary of all state and federal accreditations is provided within this report. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Nancy A. Rose Title: _____ Date: _____

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0708232**

Lab Sample ID	Client Sample ID
0708232-01	WQ-TSS/TUR-001-082907
0708232-02	WQ-TSS/TUR-002-082907
0708232-03	WQ-TSS/TUR-003-082907
0708232-04	WQ-TSS/TUR-004-082907
0708232-05	WQ-TSS/TUR-001-082907-DUP

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-082907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **0708232-01**
Date Collected: **08/29/07**
Date Received: **08/29/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	24.0		1.00	1	09/05/07	mg/L	160.2	JAD
Turbidity - 180.1	12.1		0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-002-082907**
Matrix: **Water**

Lab Code: **MA00030**

ETR: **0708232**

Lab ID: **0708232-02**

Date Collected: **08/29/07**

Date Received: **08/29/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	57.0		1.00	1	09/05/07	mg/L	160.2	JAD
Turbidity - 180.1	32.9		0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-003-082907**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **0708232-03**
Date Collected: **08/29/07**
Date Received: **08/29/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	23.5		1.00	1	09/05/07	mg/L	160.2	JAD
Turbidity - 180.1	13.4		0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-004-082907**
Matrix: **Water**

Lab Code: **MA00030**

ETR: **0708232**

Lab ID: **0708232-04**

Date Collected: **08/29/07**

Date Received: **08/29/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	24.0		1.00	1	09/05/07	mg/L	160.2	JAD
Turbidity - 180.1	18.4		0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-082907-DUP**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **0708232-05**
Date Collected: **08/29/07**
Date Received: **08/29/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	27.0		1.00	1	09/05/07	mg/L	160.2	JAD
Turbidity - 180.1	12.3		0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **WW083007B01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	08/29/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **WW090507B24**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	09/05/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **WW083007L01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	20.0	100	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

09/14/07 10:13

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0708232**

Lab ID: **WW090507L04**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	476	95	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

09/14/07 10:13

ORIGINAL

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH3; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID : MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; Metals: 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Poratable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0709042

Report Date: September 24, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0709042

Project: SBPF – Nearshore Turbidity

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report meet all applicable agency and/or NELAC standards, were performed within holding time, and with appropriate quality control measures, except where noted. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by: Nancy Rose Title: Project Manager Date: 9/24/07

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0709042**

Lab Sample ID	Client Sample ID
0709042-01	WQ-TSS/TUR-001-091107
0709042-02	WQ-TSS/TUR-001-091107
0709042-03	WQ-TSS/TUR-002-091107
0709042-04	WQ-TSS/TUR-003-091107

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-091107**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**
Lab ID: **0709042-01**
Date Collected: **09/11/07**
Date Received: **09/11/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	10.3		1.00	1	09/18/07	mg/L	160.2	JAD
Turbidity - 180.1	5.91		0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-091107**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**
Lab ID: **0709042-02**
Date Collected: **09/11/07**
Date Received: **09/11/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	43.8		1.00	1	09/18/07	mg/L	160.2	JAD
Turbidity - 180.1	6.04		0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-002-091107**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**
Lab ID: **0709042-03**
Date Collected: **09/11/07**
Date Received: **09/11/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	41.0		1.00	1	09/18/07	mg/L	160.2	JAD
Turbidity - 180.1	19.2		0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-003-091107**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**
Lab ID: **0709042-04**
Date Collected: **09/11/07**
Date Received: **09/11/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	129		1.00	1	09/18/07	mg/L	160.2	JAD
Turbidity - 180.1	52.0		0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**

Lab ID: **WW091207B16**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**

Lab ID: **WW091207L02**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	20.2	S	0.400	1	09/11/07	NTU	180.1	JAD

N/A - Not Applicable
S - Spike compound.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**

Lab ID: **WW091807B20**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	09/18/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**
Lab ID: **WW091807L04**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	508	S	1.00	1	09/18/07	mg/L	160.2	JAD

N/A - Not Applicable
S - Spike compound.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709042**

Lab ID: **WW091207L02**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	20.2	101	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

09/21/07 18:21

Laboratory Control Sample Inorganics



Client: Battelle
Project: New Bedford Harbor
Case: N/A SDG: N/A
Client ID: Laboratory Control Sample
Matrix: Water

Lab Code: MA00030
ETR: 0709042

Lab ID: WW091807L04
Date Collected: N/A
Date Received: N/A

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	508	102	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

09/21/07 18:21

Sample Receipt Checklist

Page 1 of 1

Client: <u>BATDUX</u>	Receipt Date: <u>9/11/07</u>
Project: <u>NB Harbor</u>	Log-in Date: <u>9/11/07</u>
ETR #: <u>0709042</u>	Inspection by: <u>W</u> Login by: <u>W</u>

ALL SECTIONS BELOW MUST BE COMPLETED

Comments / Notes

<p>Were samples shipped? Yes, FedEx / UPS / Other: <u>Hand delivered</u></p> <p>Is bill of lading retained? Yes, Tracking #: _____ No, Unavailable / <u>NA</u></p> <p>Number of coolers received for this project delivery: <u>1</u></p> <p>Indicate cooler temperature upon opening (if multiple coolers, record <u>all</u> temps): <u>Note</u>: If <u>all</u> coolers are 2-6°C, use one checklist, if NOT, use separate checklists and note <u>all</u> samples received <u>above</u> 6°C.</p> <p><u>Cooler 1</u>: Temperature(s) taken from: <u>5°</u> IR Gun, _____ Temp. Blank, / NA</p> <p>Were samples received on ice? <u>Yes</u> / No</p> <p>Chain-of-Custody present? <u>Yes</u> / No Complete? <u>Yes</u> / No</p> <p>Custody seals present on Cooler? Yes / <u>No</u> on Bottles? Yes / <u>No</u> Intact? Yes / No / <u>NA</u></p> <p><u>Note</u>: Affix custody seals to back of this page.</p> <p>Were sample containers intact? <u>Yes</u> / No If No, list samples: →</p> <p>Did VOA/VPH waters contain headspace (>5mm)? Yes / No / <u>NA</u> If Yes, list samples: →</p> <p>Were 5035 VOA soils, or VPH soils, covered with MeOH? Yes / No / <u>NA</u> If No, list samples: →</p> <p>Was a sufficient amount of sample received for each test indicated on the COC? <u>Yes</u> / No If No, list samples: →</p> <p>If chemical preservation is appropriate - Were samples field preserved? Yes / No / <u>NA</u> <input type="checkbox"/> C=HCl <input type="checkbox"/> M=MeOH <input type="checkbox"/> S=H₂SO₄ <input type="checkbox"/> H=NaOH <input type="checkbox"/> N=HNO₃ <input type="checkbox"/> Other: _____ <input type="checkbox"/> U= Unknown</p> <p>Preservation (pH) verified at lab for <u>EVERY</u> bottle? (Not VOA / VPH / Sulfide) YES: <2 or >12 (CN) or NO <u>NA</u> If No, why?: _____</p> <p>Were samples received within hold time? <u>Yes</u> No If No, list samples: →</p> <p>Discrepancy between samples rec'd & COC? Yes / <u>No</u> If Yes, list samples: →</p> <p>Was the Project Manager notified of any other problems? Yes / No / NA</p> <p>Project Manager Acknowledgement: <u>NA</u> Date: <u>9/11/07</u></p>	<p>Sample storage refrigerator #: <u>F2</u></p> <p>Sample storage freezer #: _____</p> <p>Cooler 2: _____ Cooler 3: _____</p> <p>Cooler 4: _____ Cooler 5: _____</p> <p>Cooler 6: _____ Cooler 7: _____</p> <p>More: _____</p> <p>Chemical preservation OK for ALL samples? Yes / No / <u>NA</u></p> <p>If No, list samples below: _____</p> <p>Please use back for any additional notes!</p>
---	---

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH3; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624)

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID : MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; : 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Potable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0709133

Report Date: October 09, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0709133

Project: New Bedford Harbor

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report were performed within holding time, and with appropriate quality control measures, except where noted. A summary of all state and federal accreditations is provided within this report. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete.

Approved by:


Nancy A. Rose

Title:


Project Manager

Date:

10/9/07

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0709133**

Lab Sample ID	Client Sample ID
0709133-01	WQ-TSS/TUR-001-092507
0709133-02	WQ-TSS/TUR-002-092507
0709133-03	WQ-TSS/TUR-003-092507
0709133-04	WQ-TSS/TUR-003-092507-DUP

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-001-092507**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**
Lab ID: **0709133-01**
Date Collected: **09/25/07**
Date Received: **09/25/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	188		1.00	1	09/28/07	mg/L	160.2	JAD
Turbidity - 180.1	63.8		0.400	1	09/25/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-002-092507**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**

Lab ID: **0709133-02**
Date Collected: **09/25/07**
Date Received: **09/25/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	227		1.00	1	09/28/07	mg/L	160.2	JAD
Turbidity - 180.1	108		0.400	1	09/25/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-003-092507**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**

Lab ID: **0709133-03**
Date Collected: **09/25/07**
Date Received: **09/25/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	27.5		1.00	1	09/28/07	mg/L	160.2	JAD
Turbidity - 180.1	13.8		0.400	1	09/25/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TUR-003-092507-DUP**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**
Lab ID: **0709133-04**
Date Collected: **09/25/07**
Date Received: **09/25/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	34.5		1.00	1	09/28/07	mg/L	160.2	JAD
Turbidity - 180.1	12.4		0.400	1	09/25/07	NTU	180.1	JAD

N/A - Not Applicable

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**

Lab ID: **WW092807B06**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	09/25/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**

Lab ID: **WW092807B13**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	09/28/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**
Lab ID: **WW092807L01**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	21.0	105	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

10/08/07 19:02

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0709133**
Lab ID: **WW092807L02**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	501	100	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

10/08/07 19:02

Proj. No		Proj. Name		SAMPLERS: Signature		ANALYSIS REQUESTED → "NUMBER OF CONTAINERS"		PEST	PCB	TPH FINGERPRINT	PAH	VOA	TBT	METALS	OTHER TSS/Turbid	ACIDIFIED	PRESERVED/ICE	Total Number of Containers
DATE	TIME	BATTELLE ID	CLIENT ID	SAMPLE DESCRIPTION														
9/25/2007	1137	WA-TSS/TUR-001-092507		55-65 NTU											✓		✓	2
9/25/2007	1157	WA-TSS/TUR-002-092507		90-100 NTU											✓		✓	2
9/25/2007	1212	WA-TSS/TUR-003-092507		10-20 NTU											✓		✓	2
9/25/2007	1212	WA-TSS/TUR-003-092507-DUP		10-20 NTU											✓		✓	2
<div>Relinquished by: Michael Walsh</div> <div>Received by: Jessica Hardy</div> <div>9/25/2007 1330</div> <div>9/25/07 1330</div>																		
<div>Relinquished by: Jessica Hardy</div> <div>Received by: [Signature]</div> <div>9/25/07 14:40</div> <div>9/25/07 1440</div>																		
<div>Comments:</div>																		

Sample Receipt Checklist

Page 1 of 1

Client: <u>BATDUX</u>	Receipt Date: <u>9/25/07</u>
Project: <u>NB Harbor</u>	Log-in Date: <u>↓</u>
ETR #: <u>0709133</u>	Inspection by: <u>W</u> Login by: <u>n</u>

ALL SECTIONS BELOW MUST BE COMPLETED

Comments / Notes

Were samples shipped? Yes, FedEx / UPS / Other: _____ No, WHG Courier pick-up / <u>Hand delivered</u>	Sample storage refrigerator #: <u>C1</u>
Is bill of lading retained? Yes, Tracking #: _____ No, Unavailable / <u>NA</u>	Sample storage freezer #: _____
Number of coolers received for this project delivery: <u>1</u>	
Indicate cooler temperature upon opening (if multiple coolers, record <u>all</u> temps): Note: If <u>all</u> coolers are 2-6°C, use one checklist, if NOT, use separate checklists and note <u>all</u> samples received <u>above</u> 6°C. <u>Cooler 1:</u> Temperature(s) taken from: <u>3</u> ° IR Gun, <u>3</u> ° Temp. Blank, / NA	Cooler 2: _____ Cooler 3: _____ Cooler 4: _____ Cooler 5: _____ Cooler 6: _____ Cooler 7: _____ More: _____
Were samples received on ice? <u>Yes</u> / No	
Chain-of-Custody present? <u>Yes</u> / No Complete? <u>Yes</u> / No	
Custody seals present on Cooler? Yes / <u>No</u> on Bottles? Yes / <u>No</u> Intact? Yes / No / <u>NA</u> Note: Affix custody seals to back of this page.	
Were sample containers intact? <u>Yes</u> / No If No, list samples: →	
Did VOA/VPH waters contain headspace (>5mm)? Yes / No / <u>NA</u> If Yes, list samples: →	
Were 5035 VOA soils, or VPH soils, covered with MeOH? Yes / No / <u>NA</u> If No, list samples: →	
Was a sufficient amount of sample received for each test indicated on the COC? <u>Yes</u> / No If No, list samples: →	
If chemical preservation is appropriate - Were samples field preserved? Yes / No / <u>NA</u> <input type="checkbox"/> C=HCl <input type="checkbox"/> M=MeOH <input type="checkbox"/> S=H ₂ SO ₄ <input type="checkbox"/> H=NaOH <input type="checkbox"/> N=HNO ₃ <input type="checkbox"/> Other: _____ <input type="checkbox"/> U=Unknown	Chemical preservation OK for ALL samples? Yes / No / <u>NA</u> If No, list samples below:
Preservation (pH) verified at lab for <u>EVERY</u> bottle? (Not: VOA / VPH / Sulfide) YES: <2 or >12 (CN) or NO <u>NA</u> If No, why?:	
Were samples received within hold time? <u>Yes</u> / No If No, list samples: →	
Discrepancy between samples rec'd & COC? Yes / <u>No</u> If Yes, list samples: →	
Was the Project Manager notified of any other problems? Yes / No / NA	
Project Manager Acknowledgement: <u>Nanaya Rose</u> Date: <u>9/26/07</u>	Please use back for any additional notes!

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH3; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624).

Massachusetts Department of Environmental Protection Certificate/Lab ID : M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID : 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID : MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; Metals: 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Potable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



ANALYTICAL REPORT

Prepared for:

Battelle

Duxbury Operations

397 Washington Street

Duxbury, MA 02332

Project: New Bedford Harbor

ETR: 0710028

Report Date: October 12, 2007

Certifications and Accreditations

Massachusetts M-MA030

Connecticut PH-0141

New Hampshire 2206

Rhode Island LAO00289

New Jersey MA015

Maine MA0030

New York 11627

Louisiana 03090

Florida E87814

Pennsylvania 68-02089

Army Corps of Engineers

Department of the Navy

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CASE NARRATIVE

Alpha Woods Hole Labs

ETR: 0710028

Project: New Bedford Harbor

All analyses were performed according to Alpha Woods Hole Labs quality assurance program and documented Standard Operating Procedures (SOPs). The analytical results contained in this report were performed within holding time, and with appropriate quality control measures, except where noted. A summary of all state and federal accreditations is provided within this report. Blank correction of results is not performed in the laboratory for any parameter. Soil/sediment samples are reported on a dry weight basis unless otherwise noted. Tissue and sediment samples are not certifiable under the NELAC accreditation.

The enclosed results of analyses are representative of the samples as received by the laboratory. Alpha Woods Hole Labs makes no representations or certifications as to the method of sample collection, sample identification, or transporting/handling procedures used prior to the receipt of samples by Alpha Woods Hole Labs. To the best of my knowledge, the information contained in this report is accurate and complete. For any questions regarding this report, please contact the signatory below at 508-822-9300.

Approved by: Nancy A. Rose Title: Project Manager Date: 10/12/07
Nancy A. Rose

Sample ID Cross Reference



Client: **Battelle**
Project: **New Bedford Harbor**

Lab Code: **MA00030**
ETR: **0710028**

Lab Sample ID	Client Sample ID
<u>0710028-01</u>	<u>WQ-TSS/TURB-001-100307</u>
<u>0710028-02</u>	<u>WQ-TSS/TURB-002-100307</u>
<u>0710028-03</u>	<u>WQ-TSS/TURB-002-100307-DUP</u>
<u>0710028-04</u>	<u>WQ-TSS/TURB-003-100307</u>

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TURB-001-100307**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **0710028-01**
Date Collected: **10/03/07**
Date Received: **10/03/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	144		1.00	1	10/10/07	mg/L	160.2	JAD
Turbidity - 180.1	71.6		0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TURB-002-100307**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **0710028-02**
Date Collected: **10/03/07**
Date Received: **10/03/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	34.3		1.00	1	10/10/07	mg/L	160.2	JAD
Turbidity - 180.1	15.5		0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TURB-002-100307-DUP**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **0710028-03**
Date Collected: **10/03/07**
Date Received: **10/03/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	28.5		1.00	1	10/10/07	mg/L	160.2	JAD
Turbidity - 180.1	16.7		0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable

Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **WQ-TSS/TURB-003-100307**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**
Lab ID: **0710028-04**
Date Collected: **10/03/07**
Date Received: **10/03/07**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	19.0		1.00	1	10/10/07	mg/L	160.2	JAD
Turbidity - 180.1	14.0		0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **WW100507B12**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	0.400	U	0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **WW100507L05**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
Turbidity - 180.1	20.4	S	0.400	1	10/03/07	NTU	180.1	JAD

N/A - Not Applicable
S - Spike compound.

Blank Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Blank**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **WW101007B46**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Result	Qualifier	Reporting Limit	Dilution	Date Analyzed	Unit	Analytical Method	Analyst
TSS - Membrane	1.00	U	1.00	1	10/10/07	mg/L	160.2	JAD

N/A - Not Applicable

U - The analyte was analyzed for but not detected at the sample specific level reported.

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**

Lab ID: **WW100507L05**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
Turbidity - 180.1	20.4	102	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

10/12/07 08:47

Laboratory Control Sample Inorganics



Client: **Battelle**
Project: **New Bedford Harbor**
Case: **N/A** SDG: **N/A**
Client ID: **Laboratory Control Sample**
Matrix: **Water**

Lab Code: **MA00030**
ETR: **0710028**
Lab ID: **WW101007L17**
Date Collected: **N/A**
Date Received: **N/A**

Parameter	Conc.	% Recovery	% Recovery Limits
TSS - Membrane	501	100	80-120

N/A - Not Applicable

Concentrations reported as calculated values, which includes rounding for significant figures. Percent recoveries and RPD values are calculated from the unrounded results.

10/12/07 08:47

Sample Receipt Checklist

Page 1 of 1

Client: BATDUX	Receipt Date: 10/3/07
Project: NB Harbor	Log-in Date: 10/3/07
ETR #: 0710028	Inspection by: W Login by: W

ALL SECTIONS BELOW MUST BE COMPLETED

Comments / Notes

<p>Were samples shipped? Yes, FedEx / UPS / Other: _____ No, WHG Courier pick-up / <u>Hand delivered</u></p>	<p>Sample storage refrigerator #: C2</p> <p>Sample storage freezer #: _____</p> <p>Cooler 2: _____ Cooler 3: _____</p> <p>Cooler 4: _____ Cooler 5: _____</p> <p>Cooler 6: _____ Cooler 7: _____</p> <p>More: _____</p>
<p>Is bill of lading retained? Yes, Tracking #: _____ No, Unavailable / <u>NA</u></p>	
<p>Number of coolers received for this project delivery: _____</p>	
<p>Indicate cooler temperature upon opening (if multiple coolers, record <u>all</u> temps): Note: If <u>all</u> coolers are 2-6°C, use one checklist, if NOT, use separate checklists and note <u>all</u> samples received above 6°C.</p>	
<p>Cooler 1: Temperature(s) taken from: 4° IR Gun, 4° Temp. Blank, / NA</p>	
<p>Were samples received on ice? <u>Yes</u> / No</p>	
<p>Chain-of-Custody present? <u>Yes</u> / No Complete? <u>Yes</u> / No</p>	
<p>Custody seals present on Cooler? Yes / <u>No</u> on Bottles? Yes / <u>No</u> Intact? Yes / No / <u>NA</u></p>	
<p>Note: Affix custody seals to back of this page.</p>	
<p>Were sample containers intact? <u>Yes</u> / No If No, list samples: →</p>	
<p>Did VOA/VPH waters contain headspace (>5mm)? Yes / No <u>NA</u> If Yes, list samples: →</p>	
<p>Were 5035 VOA soils, or VPH soils, covered with MeOH? Yes / No / <u>NA</u> If No, list samples: →</p>	
<p>Was a sufficient amount of sample received for each test indicated on the COC? <u>Yes</u> No If No, list samples: →</p>	
<p>If chemical preservation is appropriate - Were samples field preserved? Yes / No / <u>NA</u> <input type="checkbox"/> C=HCl <input type="checkbox"/> M=MeOH <input type="checkbox"/> S=H₂SO₄ <input type="checkbox"/> H=NaOH <input type="checkbox"/> N=HNO₃ <input type="checkbox"/> Other: _____ <input type="checkbox"/> U= Unknown</p>	<p>Chemical preservation OK for ALL samples? Yes / No / <u>N/A</u></p> <p>If No, list samples below:</p>
<p>Preservation (pH) verified at lab for EVERY bottle? (Not: VOA / VPH / Sulfide) YES: <2 or >12 (CN) or NO <u>NA</u> If No, why?: _____</p>	
<p>Were samples received within hold time? <u>Yes</u> No If No, list samples: →</p>	
<p>Discrepancy between samples rec'd & COC? Yes / <u>No</u> If Yes, list samples: →</p>	
<p>Was the Project Manager notified of any other problems? Yes / No / NA</p>	
<p>Project Manager Acknowledgement: APR Date: 10/3/07</p>	<p>Please use back for any additional notes!</p>

[illegible]

Certificate/Approval Program Summary



Method numbers assume the most recent EPA revisions. For a complete listing of analytes for the referenced methods please contact your Alpha Woods Hole Lab Project Manager or the Quality Assurance Manager.

Connecticut Department of Public Health Certificate/Lab ID : PH-0141 - *Wastewater* (General Chemistry: EPA 120.1, 150.1, 160.1, 160.2, 180.1, 300.0, 310.1, 335.2, 365.2; Metals: 200.8, 245.1; Organics: 608, 624, 625, ETPH) *Solid Waste/Soil* (General Chemistry: 1010, 9010/9014, 9045, 9060; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270, ETPH).

Florida Department of Health Certificate/Lab ID : E87814 - Primary NELAP Accreditation Authority for Air & Emissions. Secondary NELAP Accreditation for Wastewater and Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 335.2, 365.2, SM2320B, SM2340B, SM2540G, SM4500NH3; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: 9010/9014, 9045, 9050, 9056, 9065, Reactivity 7.3; Metals: 6020, 7470, 7471; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Louisiana Department of Environmental Quality Certificate/Lab ID : 03090 - Primary NELAP Accrediting Authority for Wastewater, Solid & Hazardous Waste. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1, 6020; Organics: 608, 624, 625, 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Solid and Hazardous Waste* (General Chemistry: 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060, Reactivity 7.3; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270).

Maine Department of Human Services Certificate/Lab ID : MA0030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: 608, 624).

Massachusetts Department of Environmental Protection Certificate/Lab ID: M-MA030 - *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 335.2, 365.2; Metals: EPA 245.1; Organics: EPA 608, 624).

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 365.2, 376.2, SM2540G; Metals: 200.8, 245.4; Organics: 608, 624, 625).

New Jersey Department of Environmental Protection Certificate/Lab ID: MA015 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 180.1, 300.0, 310.1/SM2320B, 335.2, 376.2, 9010/9014, 9056, SM2540G; Metals: 200.8, 245.1 6020; Organics: 608, 624, 625, 8081, 8082, 8260, 8270). *Solid & Hazardous Waste* (General Chemistry: EPA 1010, 1311, 9010/9014, 9040, 9045, 9056, 9060; Metals: 6020, 7196, 7470, 7471; Organics: 8015-DRO/GRO, 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

New York Department of Health Certificate/Lab ID : 11627 - Secondary NELAP Accreditation. *Wastewater* (General Chemistry: EPA 120.1/SM2510B, 150.1, 160.1/SM2540C, 160.2/SM2540D, 300.0, 310.1/SM2320B, 365.2, 376.2; Metals: 245.1; Organics: 608, 624, 625). *Solid and Hazardous Waste* (General Chemistry: EPA 1010, 1311; : 245.1; 6020, 7041; Organics: 8081, 8082, 8260, 8270). *Air & Emissions* (Organics: EPA TO-15).

Rhode Island Department of Health Certificate/Lab ID : LAO00289 - Chemistry: *Organic and Inorganic in Non-Poratable Water, Wastewater/Sewage and Soil* (Refer to LADEQ and MADEP certificates for method numbers.)

Pennsylvania Department of Environmental Protection Certificate/Lab ID : 68-02089 - Registered laboratory

U.S. Army Corps of Engineers

Department of the Navy



US ARMY CORPS
OF ENGINEERS
New England District

Contract No. DACW33-03-D-0004

Delivery Order No. 22

June 2008

FINAL
**North of Wood Street Monitoring
Summary Report
2007 Remedial Dredging**



**Environmental Monitoring, Sampling, and
Analysis**

**New Bedford Harbor Superfund Site
New Bedford Harbor, MA**

FINAL REPORT

**North of Wood Street Monitoring Summary Report
2007 Remedial Dredging**

**Environmental Monitoring, Sampling, and Analysis
New Bedford Harbor Superfund Site
New Bedford Harbor, MA**

Submitted to:

**Department of the Army
U.S. Army Corps of Engineers
North Atlantic Division
New England District**

**Contract Number: DACW33-03-D-0004
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Prepared by:

**Battelle
397 Washington Street
Duxbury, MA 02332
(781) 934-0571**

June 2008

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APPENDICES

Appendix A: Sediment Sampling Logs and Core Photographs

Appendix B: PCB Analytical Data



EXECUTIVE SUMMARY

Environmental sampling and analysis was performed at the North of Wood Street (NWS) area in November and December 2007 in support of remedial dredging activities at the New Bedford Harbor Superfund Site. In 2002–2003 approximately 15,000 cubic yards of material was removed from the NWS area. The NWS area was remediated using a dry excavation method to eliminate the potential for sediment resuspension and recontamination. Annual investigations have been conducted since 2004 to assess the effectiveness of prior remediation and potential recontamination of this area due to sediment transport from unremediated areas. Post-remediation sampling conducted in 2004 identified a shoreline area in Acushnet that should have been included in the 2002–2003 cleanup but which was inadvertently missed (this missed area was then remediated in 2005). Additional studies in the NWS area are planned for 2008.

Twenty-one stations in the NWS area were sampled in 2007, including 14 river sediment locations and 7 marsh soil locations along the eastern and western shores of the river. River sediments were generally comprised of a layer of fine black silt underlain by sand, clay or silt. River sediments located closer to the shore and further upstream were comprised of brown organic sand and silt underlain by gravel and/or sand. Shoreline soils were generally comprised of brown organic silt and sand underlain by sand or gravel, silt and sand.

In 2007, total PCB concentrations in river sediment samples ranged from 0.4 milligrams per kilograms (mg/kg) to 270 mg/kg dry weight. The highest concentrations of total PCB (>100 mg/kg) were measured in sediment at stations C007-039, C007-055, and C007-033. The lowest concentrations (<5 mg/kg total PCB) were measured in sediment collected closer to the shoreline and further upstream. Total PCB concentrations were below the applicable recreational cleanup criteria (25 mg/kg) at all shoreline locations in 2007.

Sediment data from the 2003–2007 monitoring period show that total PCB concentrations in river sediment at the NWS area are spatially and temporally variable, which may reflect differences in bulk sediment characteristics and the highly dynamic nature of the system. Total PCB concentrations in 2003 were among the lowest measured during the monitoring period. Total PCB concentrations increased at most stations following the remediation of the NWS area in the winter of 2002–2003. The post-remediation increase was relatively small at some stations (C007-016, 023, 040, 049, 062) and larger at others (C007-028, 033, 038, 039, 048, and 055). The apparent increase could have resulted from contaminant transport from the upper harbor during dredging activities or natural transport (e.g., sediment resuspension and transport during tidal cycles and/or high winds) of contaminated sediment from unremediated areas of the harbor that are subject to dynamic sediment movement.

Shoreline soil data from the 2006–2007 monitoring period suggest that the remediation was effective, in that total PCB concentrations were below the 25 mg/kg recreational shoreline land use criteria for this area at all stations.



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1.0 INTRODUCTION

The New Bedford Harbor Superfund Site (Site), located in Bristol County, Massachusetts (MA), extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into 17,000 adjacent acres of Buzzards Bay (Figure 1). Industrial and urban development surrounding the harbor has resulted in sediments becoming contaminated with high concentrations of many pollutants, notably polychlorinated biphenyls (PCBs) and heavy metals. Two manufacturers in the area used PCBs while producing electronic devices from the 1940s to the late 1970s, when the use of PCBs was banned by the U.S. Environmental Protection Agency (USEPA). Based on human health concerns and ecological risk assessments, USEPA added New Bedford Harbor to the National Priorities List in 1983 as a designated Superfund Site. Through an Interagency Agreement between the USEPA and the U.S. Army Corps of Engineers, New England District (USACE NAE), the USACE is responsible for carrying out the design and implementation of the remedial measures at the site. The Site has been divided into three areas – the upper, lower and outer harbors – consistent with geographical features of the area and gradients of contamination (Figure 2).

Aerovox Inc. located in New Bedford, MA used PCBs in the manufacture of electrical capacitors from approximately 1940 to 1977. This facility is located in the upper harbor and is considered one of the major sources of historic PCB contamination to New Bedford Harbor. The highest concentrations of PCBs were found in sediments in a 5-acre area in the northern portion of the Acushnet River Estuary adjacent to the Aerovox facility. These ‘hot spot’ sediments, which contained PCBs upwards of 100,000 milligrams per kilogram (mg/kg), were removed between 1994 and 1995 as part of USEPA’s 1990 “Hot Spot” Record of Decision (ROD). Full scale remediation dredging per the 1998 Upper and Lower Harbor ROD was initiated in 2004 and continued in 2005, 2006, and 2007. Another known source of PCB contamination in New Bedford Harbor is related to activities at the Cornell-Dubilier mill on the western shore of the outer harbor (Figure 2). In 2005, a 15 acre underwater cap pilot project was implemented near Cornell-Dubilier to cap PCB-contaminated sediments.

Located at the far northern end of the Upper Harbor are areas which were prioritized for restoration activities based on their proximity to shoreline residential and recreational land use areas. The North of Wood Street (NWS) area includes in-river sediments and marsh soils on the eastern and western shores of the river. The NWS study area extends from approximately 250-ft south of the Wood Street bridge to approximately 0.25 miles north of the bridge. Sediments and marsh soils at the NWS area previously had PCB concentrations as high as 46,000 mg/kg. The 1998 ROD established the following clean up criteria: 1 mg/kg for residential shoreline areas, 10 mg/kg for the sub-tidal sediments, 25 mg/kg for the top foot of recreational land use shoreline soils and 50 mg/kg for shoreline soils deeper than the top foot in residential and recreational land use areas.

In the winter of 2002-2003 approximately 15,000 cubic yards of material was removed from the NWS area. The site was remediated using temporary dams and pumps to divert river water around the site. This allowed excavation activities to be conducted on dry sediments and soils, thus eliminating the potential for sediment resuspension and recontamination. Clean fill was



used to restore the river banks, but sub-tidal areas were left at the depth of excavation (i.e., not backfilled). Marsh and upland vegetation was planted above the low water line to stabilize and restore the shoreline. In August of 2004 post-remediation sampling revealed elevated PCB concentrations on the eastern shoreline of the NWS area, and in certain sub-tidal locations. Elevated concentrations were found above the high tide line suggesting that incomplete remediation was a more likely cause than recontamination from in-river sources. Additional remediation and restoration efforts were conducted in December 2005 to remove the remaining contamination. Samples collected before and after this effort showed an improvement in shoreline PCB concentrations (ENSR, 2006).

Additional sampling was conducted in 2006 and 2007 to assess the effectiveness of prior remediation and potential recontamination of this area due to sediment transport from unremediated areas. Twenty-one (21) locations were sampled, including 14 sediment stations in the river, 5 soil locations in the remediated marsh area on the east side of the river south of River View Park, and 2 shoreline stations on the lumber yard site on the west side of the river (Figure 3).

This report presents results from the November/December 2007 investigation and evaluates the results with respect to earlier investigations conducted at the NWS area. A description of the 2007 sampling and analysis methods is provided in Section 2.0. Results of the 2007 investigation, including physical characteristics of the river sediment and shoreline soils and sample chemistry, are provided in Section 3.0. A discussion of the NWS results is provided in Section 4.0. References are provided in Section 5.0

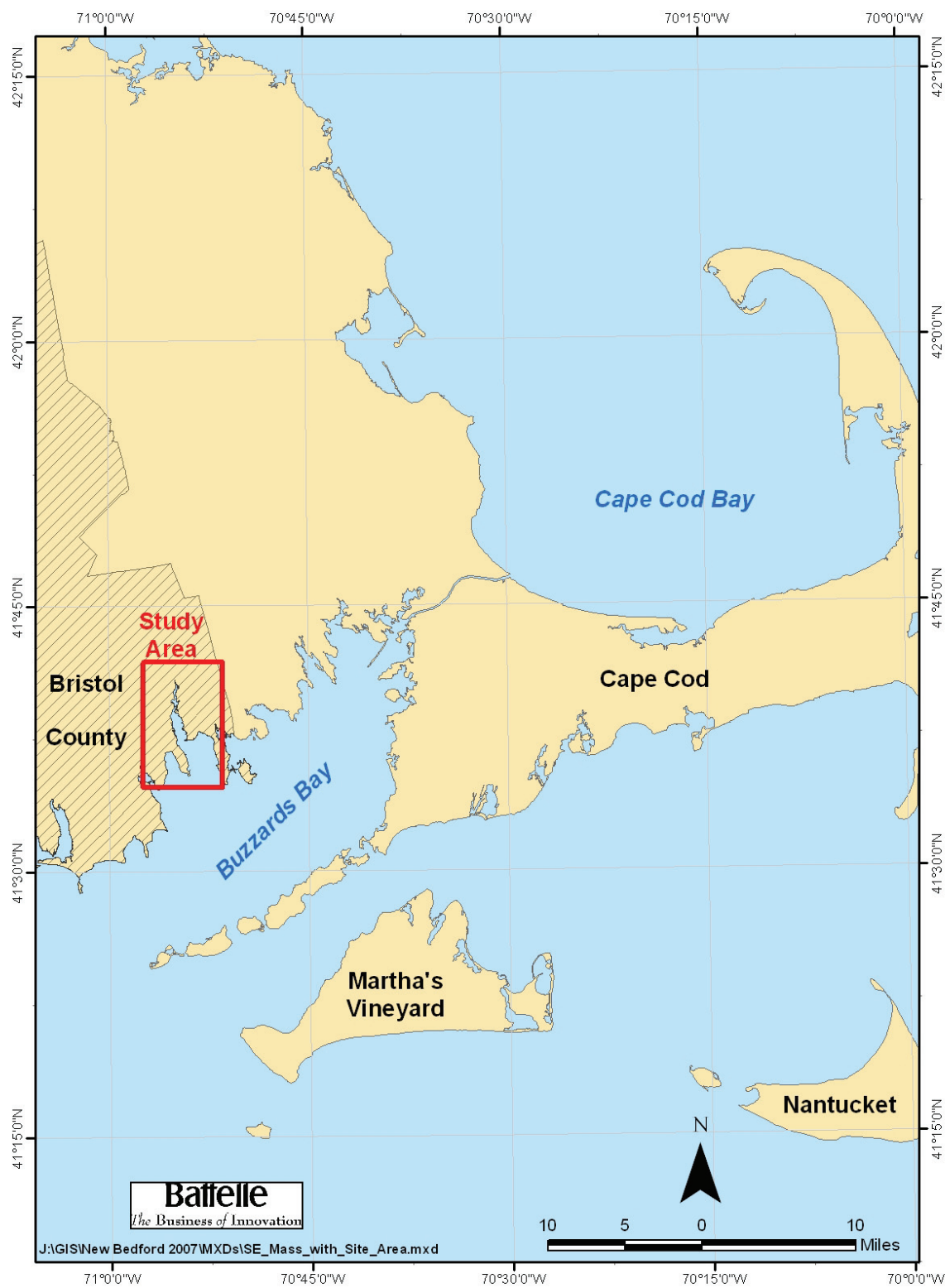


Figure 1. Location of the Site in Southeastern, MA.



Figure 2. New Bedford Harbor Project Areas.



Figure 3. Locations of 2007 NWS Sampling Stations



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2.0 METHODS

Environmental sampling and analysis methods utilized for the November/December 2007 investigation are summarized below and described in detail in the project work plans (Battelle, 2006a, b, and c). Twenty-one (21) locations were sampled in 2007, including 14 sediment stations in the river and 7 soil stations located at recreational land use shoreline soil areas along the east and west side of the river (Figure 3). Station locations were based on locations sampled previously in 2006.

2.1 Sediment and Shoreline Soil Collections

In-river sediments were collected in Lexan™ core barrels attached to a stainless steel push core sampler. In all cases, a one foot core was targeted. Samples in deeper waters were collected from a boat, while shallow water samples were collected by wading. The push core sampler is designed to securely hold one end of a pre-cut length of core barrel. The stainless steel socket which holds the core liner was attached to a suitable length of push rod based on the water depths for the sampling effort. A piston assembly inside the core barrel was used to create suction during retrieval of the sample so that no sediment was lost from the bottom the barrel. The piston assembly was positioned just inside the leading end of the core liner and the piston line was held loosely on deck. The device was lowered into the water until the leading end of the core bore barrel contacted the sediment surface. The piston attachment line was then tied off securely on the deck, thus fixing the elevation of the piston assembly. In driving the push-core into the sediment, the piston created a syringe effect as the core liner was driven past the fixed elevation of the piston. The sampler was recovered onto the deck of the survey vessel. The bottom end of the core barrel was fitted with a plastic cap, after which the sediment on the external body of the sampler was rinsed off. After thoroughly cleaning the sampling device the core liner was removed from the socket assembly, the piston assembly was then removed, and the top of the core liner was fitted with a plastic end cap. Shoreline soil samples were collected in Lexan™ core barrels inserted into a soil auger. Sample collection data, including collection date and time, station coordinates, and sample ID, were documented on Sediment Sampling Log forms. All cores were kept intact in the liners and returned to the Sawyer Street field trailer for processing (Section 2.2).

2.2 Core Processing

Core processing was performed at the Sawyer Street field trailer. Each core was photo-documented, visually characterized, and subsampled for chemical analysis.

All cores were documented with digital photographs. Digital photographs of the cores were uploaded to the New Bedford Harbor project database. These photographs are linked in the database to the location information and to the analytical results and can be viewed individually. Each photograph contains the following elements in the frame:

- *The sediment core.* Photographing was done through the clear liner.
- *Measurement reference.* A tape measure (or equivalent) marked in decimal feet ran parallel to length of the core.



- *Sample identifier.* A card, paper, whiteboard, or equivalent was placed next to the core with the following written information:
 - Sample ID – an alpha numeric code that identifies sample matrix, sampling year, station location, and depth interval sampled
 - Sample Collection Date

Each core was visually characterized and physical characteristics, including material type, color, consistency, particle size, and odor, was documented on the Sediment Sampling Log forms. Each core was then subsampled for chemical analysis. Two 6-inch composite samples were taken from each core, homogenized, and placed into sample containers. The sample from the 0.0 – 0.5 foot interval was submitted for PCB analysis. The sample from the 0.5 – 1.0-foot interval was frozen and archived at the Site until further notice. Samples were collected into pre-cleaned, 8-oz glass jars with Teflon lined lids. All samples were held on ice while in the field and frozen upon receipt at the laboratory. Copies of the sample field logs and custody records are maintained with the project files at Battelle.

2.3 Chemical Analysis

All river sediment and shoreline soil samples were analyzed for PCB congeners and a subset of the samples were also analyzed for PCB homologues. PCB analyses were performed by Battelle, located in Duxbury, MA. Samples were mixed in the container, and approximately 10 g was removed, placed on aluminum foil, and air-dried overnight in a fume hood to ensure percent solids in the samples were >50%. Approximately 5 g of the air-dried sample was spiked with surrogates and extracted using Accelerated Solvent Extraction (ASE) following modified EPA Method 3545. The extracts were processed through activated copper for sulfur removal and then received disposable Florisil column clean-up. The post-Florisil extract was concentrated, fortified with internal standards (IS), and submitted for analysis.

All sample extracts were analyzed for the 18 NOAA PCB congeners using gas chromatography/electron capture detection (GC/ECD) using dual column confirmation, following modified EPA Method 8082. Sample data were quantified by the method of internal standards, using the IS compounds. Positive congener results were confirmed by a secondary column confirmation analysis with the higher of the two results reported, unless analyst discretion required otherwise (e.g. the result without an interference signal was reported).

Approximately 7.5% of the samples were analyzed for PCB homologues using gas chromatography/mass spectrometry (GC/MS), following modified EPA Method 8270C. Sample data were quantified by the method of internal standards, using the IS compounds.

PCB congener and homologue results are reported in mg/kg dry weight and to two significant figures in this report. Concentrations of total PCB were calculated using the congener and homologue results. First, total PCB was calculated as the sum of the 18 NOAA congeners multiplied by the project-specific factor of 2.6. Next, total PCB was calculated as the sum of the homologues. A value of zero (0) was used in the summation for non-detects.



3.0 RESULTS

3.1 Sediment and Shoreline Soil Collections

A total of 15 surface sediment samples (14 field samples + 1 field duplicate) were collected from the Acushnet River in the NWS area (Figure 3). A total of eight shoreline soil samples (seven field samples + one field duplicate) were also collected; five samples were collected from the eastern shoreline and two from the western shoreline (Figure 3). Sample collection data, including station ID, collection date and station coordinates are summarized in Table 1.

Table 1. Summary of Samples Collected at the NWS Area, November/December 2007.

Station ID	Sample Type	Collection Date	Collection Time	Northing (NAD 83 MA ft)	Easting (NAD 83 MA ft)
C007-010	River Sediment	11/14/2007	10:28	2709127	815353
C007-016		11/9/2007	8:21	2708950	815396
C007-023		11/9/2007	8:38	2708814	815411
C007-028		11/9/2007	8:55	2708703	815400
C007-030E		11/8/2007	13:24	2708683	815499
C007-030W		11/9/2007	11:44	2708653	815363
C007-033		11/12/2007	11:33	2708614	815412
C007-038		11/9/2007	9:53	2708516	815383
C007-039		11/9/2007	9:30	2708513	815412
C007-040		11/9/2007	9:19	2708514	815462
C007-048		11/14/2007	9:16	2708385	815413
C007-049		11/14/2007	9:30	2708402	815468
C007-049 Dup		11/14/2007	9:37	2708402	815468
C007-055		11/14/2007	9:04	2708267	815460
C007-062		11/14/2007	8:50	2708165	815565
07-NWS-33	Shoreline Soil	11/9/2007	10:58	2709040	815330
07-NWS-34		11/9/2007	11:15	2708923	815338
07-NWS-35		11/8/2007	12:28	2708761	815503
07-NWS-36		11/8/2007	12:12	2708761	815516
07-NWS-37		11/8/2007	12:40	2708682	815535
07-NWS-38		11/8/2007	13:45	2708819	815500
07-NWS-39		12/6/2007	11:45	2708819	815509
07-NWS-39 Dup		12/6/2007	11:50	2708819	815509

3.2 Physical Characteristics

River sediments and shoreline soils were visually characterized and physical characteristics, including material type, color, consistency, particle size, and odor, are documented on the Sediment Sampling Log forms provided in Appendix A. Digital photographs of the cores are also provided in Appendix A.



3.2.1 River Sediments

The physical characteristics of surface sediments collected at most river stations were similar, and were characterized by a layer (0.2 – 0.8 feet) of fine black silt underlain by sand, clay or silt. The physical characteristics of sediment located closer to the shoreline and further upstream were different compared to in-river sediment locations. For example, station C007-030W, located near the western shore of the river, was comprised of medium to fine, brown sand with organic material underlain by sand. Station C007-030E, located near the eastern shore of the river, was comprised of fine to coarse, dark brown organic sand and silt underlain by gravel and sand. Station C007-010, located at the northern boundary of the NWS area, was comprised of fine to coarse, grey-black sand and gravel.

3.2.2 Shoreline Soils

Soils located along the western shore were generally comprised of fine to medium, firm brown organic material with sand underlain by sand. Soils located along the eastern shore were generally comprised of fine to coarse, loose brown organic silt and sand underlain by gravel, silt and sand. Shoreline soils at stations NWS-34, NWS-35, and NWS-37 had a more uniform composition within the top one foot.

3.3 Polychlorinated Biphenyls

Total PCB concentrations measured in river sediments and shoreline soils collected at the NWS area in November/December 2007 are summarized in Table 2 and shown in Figure 4. Complete PCB congener and homologue results are provided in Appendix B.

Table 2. Total PCB Concentrations in Sediment and Shoreline Soil at the NWS Area, November/December 2007

River Sediment		Shoreline Soil	
Station ID	Total PCB (a) (mg/kg dry)	Station ID	Total PCB (a) (mg/kg dry)
C007-010	4.5	07-NWS-33	0.089
C007-016	29	07-NWS-34	7.4
C007-023	23	07-NWS-35	0.19
C007-028	78	07-NWS-36	0.31
C007-030E	0.44	07-NWS-37	4.5
C007-030W	0.4	07-NWS-38	0.26
C007-033	120	07-NWS-39	0.035
C007-038	68	07-NWS-39 Dup	0.06
C007-039	270		
C007-040	20		
C007-048	43		
C007-049	25		
C007-049 Dup	32		
C007-055	190		
C007-062	23		

(a) Sum of 18 congeners x 2.6

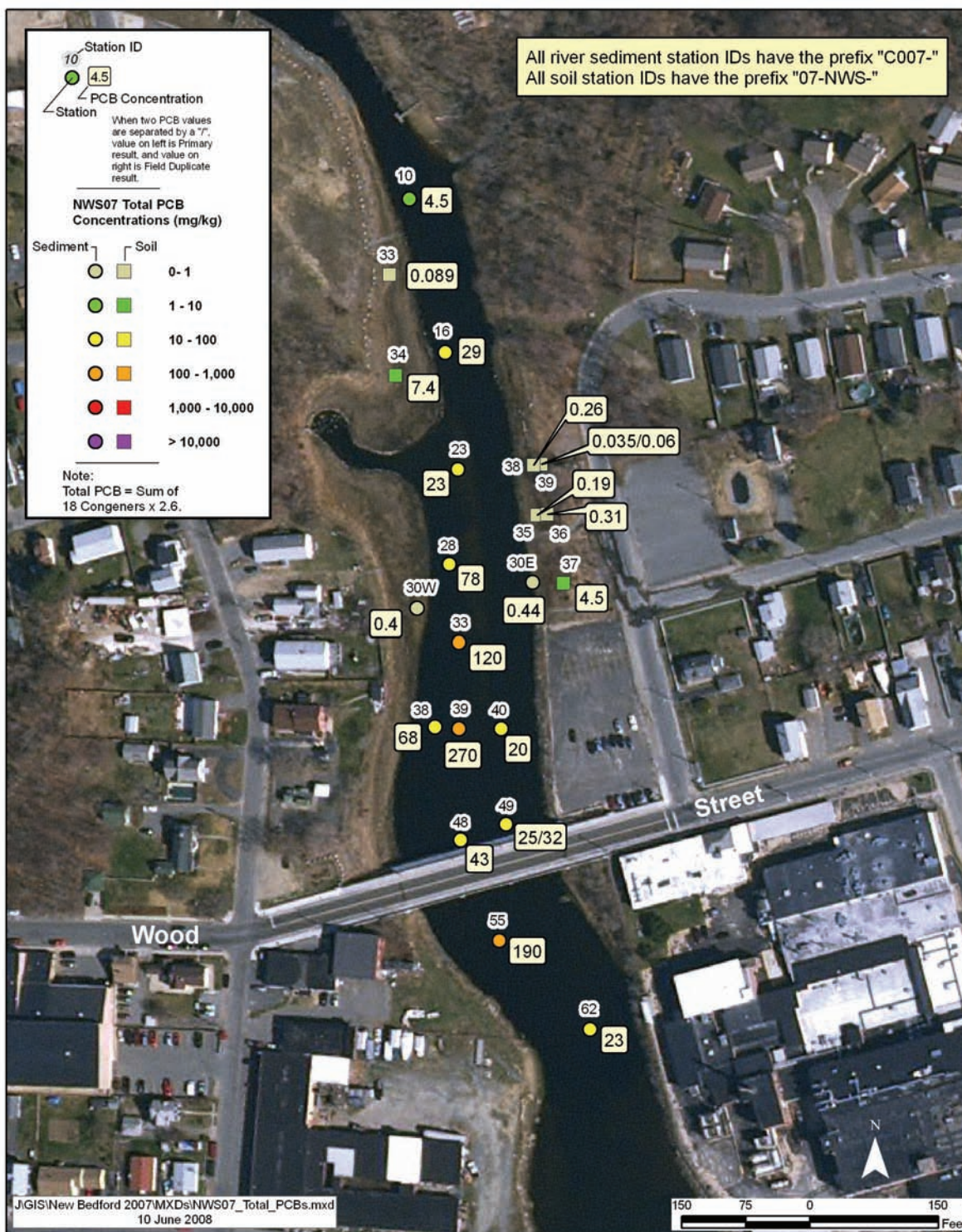


Figure 4. Total PCB Concentrations in River Sediment and Shoreline Soil Samples at the NWS Area, November/December 2007



3.3.1 River Sediments

Total PCB concentrations in river sediment samples ranged from 0.4 mg/kg to 270 mg/kg (Table 2). The highest concentrations of total PCB (> 100 mg/kg) were measured in surface sediment at station C007-039, followed by C007-055, and C007-033 (Figure 4). Lower concentrations of total PCB (< 5 mg/kg) were measured in sediment collected closer to the shoreline (C007-030W and C007-030E) and further upstream (C007-010) (Figure 4, Table 2).

3.3.2 Shoreline Soils

Total PCB concentrations in the shoreline soils ranged from 0.035 mg/kg to 7.4 mg/kg (Table 2). The highest concentrations of total PCB were measured in surface soil at station 07-NWS-34 (7.4 mg/kg), located on the west shore (Figure 4). The next highest concentration of total PCB was measured in surface soil at station 07-NWS-37 (4.5 mg/kg), located on the east shore (Figure 4). Total PCB concentrations were below 1 mg/kg in all other surface soil samples (Table 2).

3.4 PCB Homologue Comparison

All river sediment and shoreline soils were analyzed for PCB congeners and 3 of the 23 samples (2 river sediment and 1 shoreline soil) were also analyzed for PCB homologues. A comparison of the total PCB concentrations, calculated using both the congener and homologue data, is summarized in Table 3. Total PCB concentrations calculated by both methods are comparable for two of the three samples. Total PCB concentrations are considerably different for one of samples, with a higher value calculated using the congener method (Table 3). A larger number of samples from the harbor-wide sediment program were collected for congener-homologue comparison and those data are discussed in the Sediment Monitoring Summary Report for 2007 Remedial Dredging (Battelle, 2008).

Table 3. Total PCB Concentrations Calculated by Congener and Homologue Results

Station ID	Sample Type	Total PCB (mg/kg dry)		
		Sum 18 Congeners (a)	Sum Homologue (b)	RPD
C007-016	River Sediment	29	30	3.4
C007-039		270	160	51
07-NWS-34	Shoreline Soil	7.4	6.9	7.0

(a) Sum of 18 congeners x 2.6, non-detect = 0 mg/kg.

(b) Sum of 10 homologue groups, non-detect = 0 mg/kg.

RPD, relative percent difference.



4.0 DISCUSSION

Several investigations have been conducted to characterize PCB contamination at the NWS area following remediation activities conducted in 2002-2003 to remove PCB-contaminated sediments and soils from the river and surrounding shoreline (TTFW, 2004). A confirmatory sampling event was conducted by TTFW immediately following the remediation in February 2003 (see North of Wood Street Cleanup Zone Map, available at <http://www.epa.gov/ne/nbh/>). ENSR conducted four sampling events in the area to evaluate changes in river sediment PCB concentrations that may have occurred due to seasonal influence and/or dredging/ remediation activities, as follows: August 2004 (pre-dredging), May 2005 (spring flow conditions), September 2005 (pre-dredging, late summer flow), and January 2006 (post-dredging). Battelle conducted two post-dredging sampling events in November 2006 and November/December 2007 to further assess potential recontamination of the NWS area.

4.1 River Sediments

Total PCB concentrations measured in river sediments at the NWS area between 2003 and 2007 are summarized in Table 4. Station-specific and system-wide average¹ concentrations of total PCB between 2003 and 2007 are shown in Figures 5 and 6, respectively. Sediment data from the 2003–2007 monitoring period show that total PCB concentrations in river sediment at the NWS area are spatially and temporally variable (Figures 5 and 6), which makes it difficult to discern clear trends in the data. The lowest concentrations of total PCB in river sediment were measured in 2003, immediately following the remediation of the NWS area in the winter of 2002-2003 (Figures 5 and 6). A post-remediation increase in total PCB concentrations was observed in 2004 (Figures 5 and 6). While total PCB concentrations decreased in subsequent sampling events, post-remediation levels in 2007 remain elevated at most stations compared to 2003 (Figure 5). The post-remediation increase between 2003 and 2007 was small² at some stations (C007-016, 023, 040, 049, 062) and larger³ at other stations (C007-028, 033, 038, 039, 048, and 055) (Figure 5). System-wide average concentrations of total PCB in sediment at the NWS area have decreased since the 2004 post-remediation increase, and have ranged⁴ from 16 mg/kg in 2005 to 53 mg/kg in 2007.

The NWS area is characterized by heterogeneous sediments, and the variability among the PCB data likely reflects differences in bulk sediment characteristics (e.g., grain size and organic carbon content). The NWS area is also subject to dynamic sediment movement, and the apparent increase in PCB concentrations at some stations could have resulted from contaminant transport from the upper harbor during dredging activities or natural transport (i.e., non-dredging related such as sediment resuspension and transport during tidal cycles and/or high winds) of contaminated sediment from unremediated areas. Annual sediment monitoring will continue at the NWS area as needed to assess the potential for recontamination from the unremediated harbor areas immediately to the south.

¹ The system-wide concentration is an area-wide average concentration calculated as the average PCB concentration across all stations within a given sampling event.

² Small increase - 2007 values typically less than six times 2003 values.

³ Larger increase – 2007 values typically two orders of magnitude higher compared to 2003 values.

⁴ Range values are based on ‘common’ set of stations sampled consistently across all sampling events.



Table 4. Total PCB Concentrations in River Sediment at the NWS Area, 2003 to 2007.

Station ID	Total PCB (a) (mg/kg dry)						
	Jan/Feb-2003	Aug-2004	May-2005	Sep-2005	Jan-2006	Nov-2006	Nov/Dec-2007
C007-010	6.1D	20	-	81	0.99	2.4	4.5
C007-016	4.6D	13	-	18	16	15	29/30 ^(c)
C007-023	8.3D	22	3.8	2	6.6	8.5	23
C007-028	0.49DU	63	9.8	0.22	11	18	78
C007-030E	-	-	-	0.7 (b)	88	0.72	0.44
C007-030W	-	-	-	0.4 (b)	5.2	0.16	0.4
C007-033	0.39DU	64	22	1.1	17	93	120
C007-038	0.45DU	36	-	4.7	8.6	1.8	68
C007-039	0.54DU	64	4.6	-	-	13	270/160 ^(c)
C007-040	2.9D	72	79	73	190	47	20
C007-048	0.43DU	23	9	-	-	100	43
C007-049	12D	160	36	5.9	3.6	12	25
C007-055	0.42DU	61	-	7	20	9.6	190
C007-062	7.4D	19	-	0.87	1.3	40	23

D: result from dilution analysis; U: non-detect, detection limit reported.

(a) Sum of 18 congeners x 2.6

(b) Data were not in the New Bedford Harbor Database. Total PCB values from ENSR (2006).

(c) Total PCB result based on homologue analysis (see Table 3).

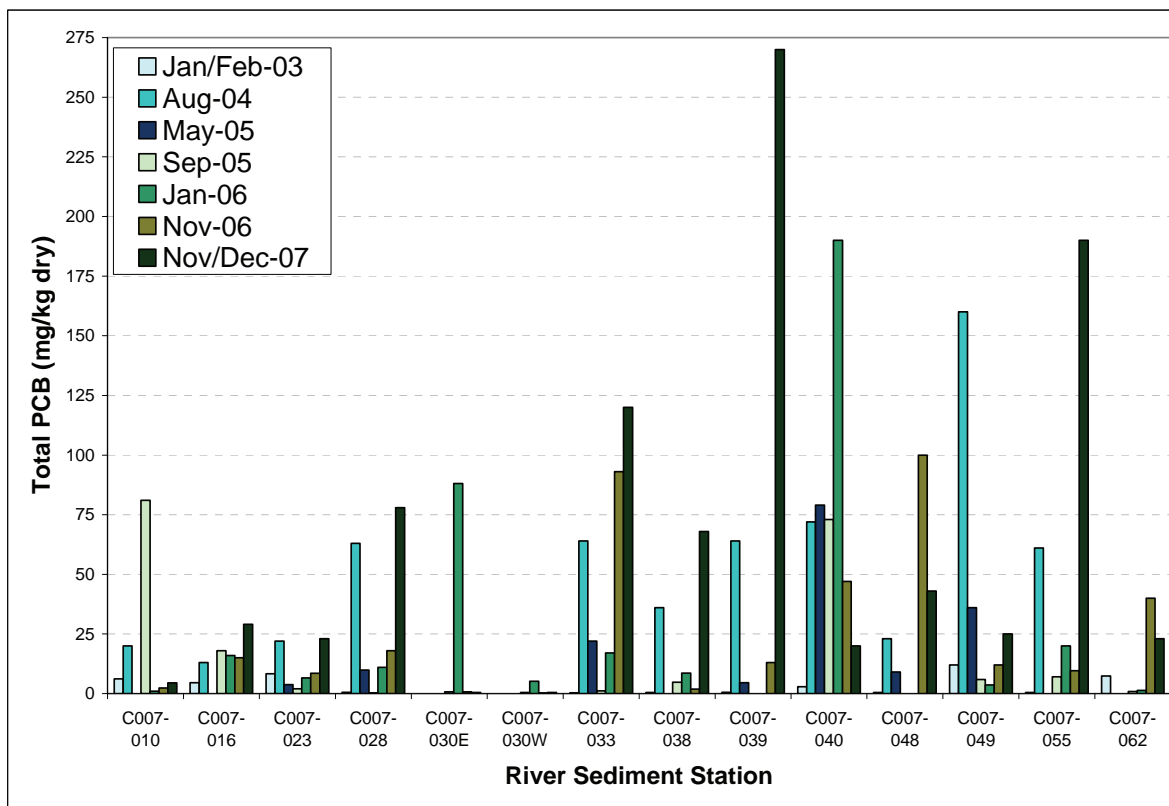


Figure 5. Station-specific Trends in Total PCB Concentrations in Sediment at the NWS Area, 2003 to 2007

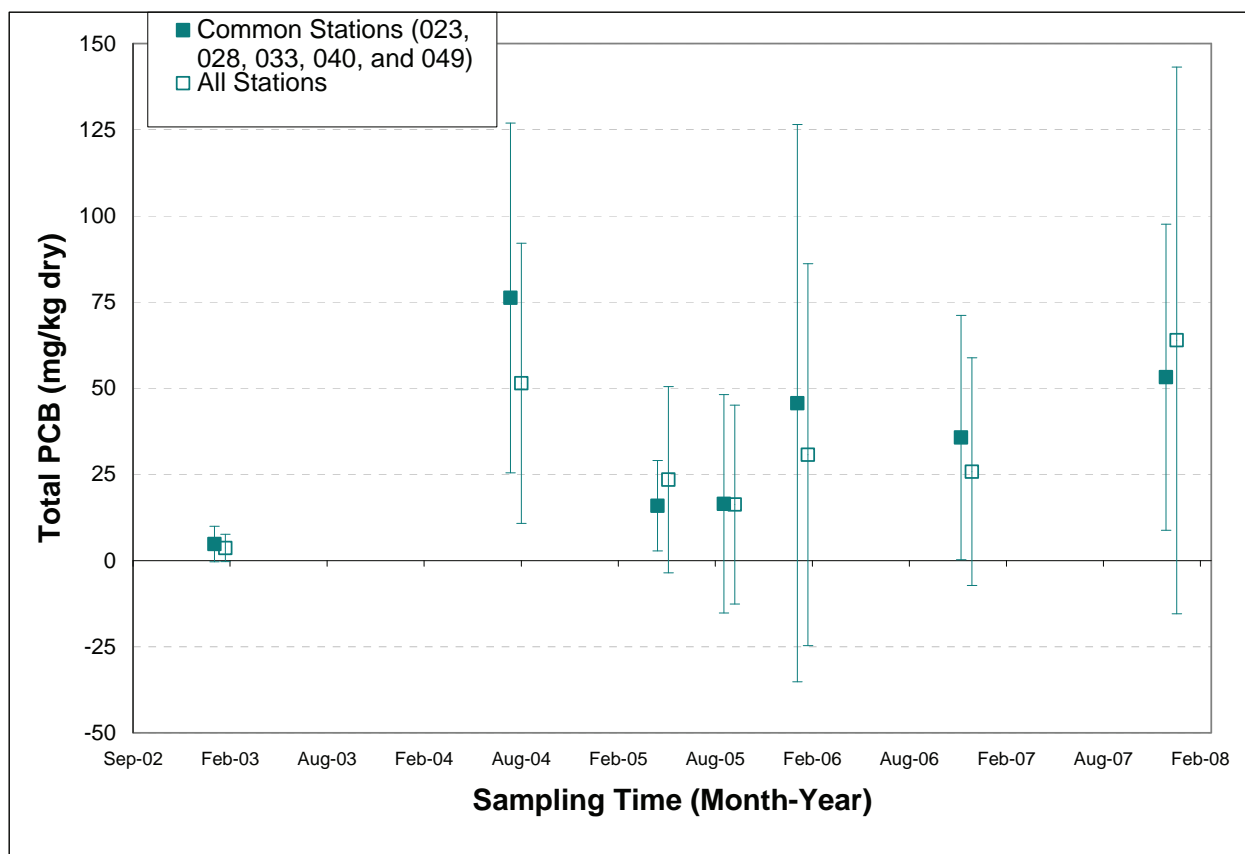


Figure 6. System-wide Trends in Total PCB Concentrations in Sediment at the NWS Area, 2003 to 2007. The system-wide concentration is the average concentration of all data for a given sampling event. System-wide average concentrations are presented for ‘common stations’ and ‘all stations’. Common stations are a sub-set of the sampling stations that were sampled consistently across all sampling events (i.e., C007-023, 028, 033, 040, and 049). The ‘all station’ average is based on all available data from all stations (the number of stations sampled varies by sampling event, ranging from 7 stations sampled in 2003 to 14 stations sampled in 2006 and 2007). The errors bars represent one standard deviation.

4.2 Shoreline Soils

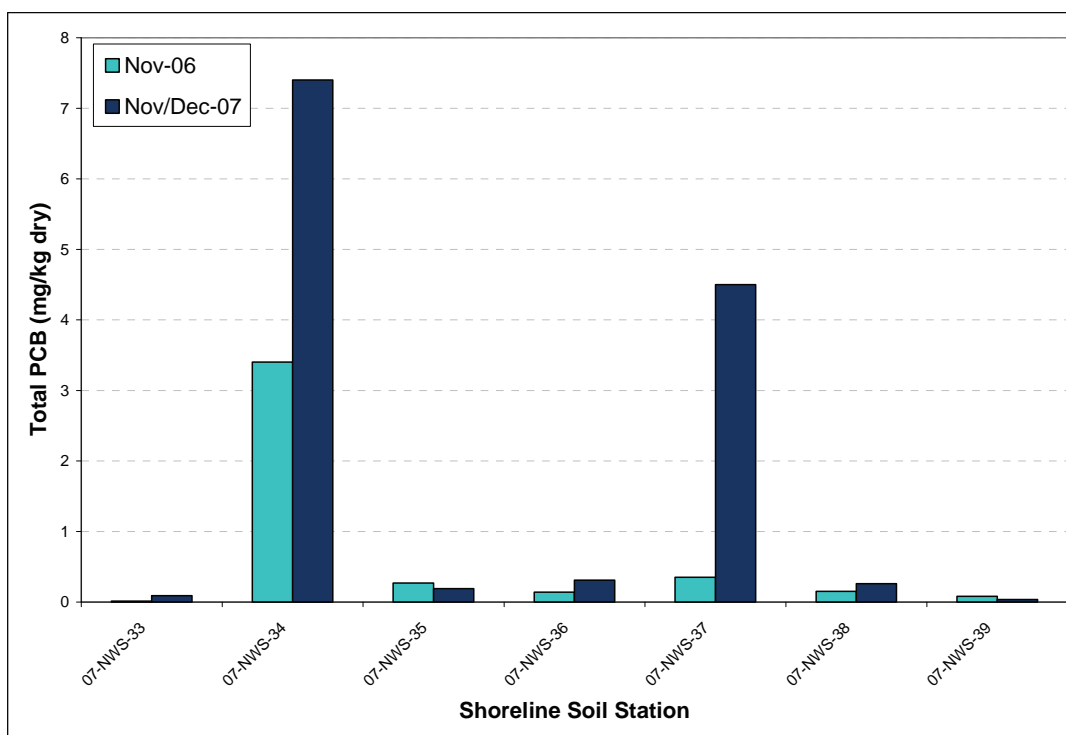
Total PCB concentrations in shoreline soils is summarized in Table 5 and shown in Figure 7. In December 2005, Jacobs Engineering performed additional remediation at the eastern shoreline of the NWS area to remove contaminated soils/sediments that were inadvertently missed during the 2002-2003 remediation. PCB results from post-remediation sampling conducted in 2006 and 2007 suggest that the remediation was effective, in that total PCB concentrations were below the 25 mg/kg recreational shoreline land use criteria for this area at all stations (Table 5, Figure 7). Substantive changes in shoreline total PCB concentrations between the 2006 and 2007 sampling events were not observed, except at station NWS-37 where the concentration increased by an order of magnitude in 2007 compared to 2006. Even so, the PCB concentration measured in 2007 was well below the 25 mg/kg cleanup criteria for this area.



Table 5. Total PCB Concentrations in Shoreline Soil at the NWS Area, 2006 and 2007.

Station	Total PCB (a) (mg/kg dry)	
	Nov-2006	Nov/Dec-2007
<i>Western Shoreline</i>		
07-NWS-33	0.014	0.089
07-NWS-34	3.4	7.4
<i>Eastern Shoreline</i>		
07-NWS-35	0.27	0.19
07-NWS-36	0.14	0.31
07-NWS-37	0.35	4.5
07-NWS-38	0.15	0.26
07-NWS-39	0.082	0.035
07-NWS-39 Dup	-	0.06

(a) Sum of 18 congeners x 2.6



**Figure 7. Total PCB Concentrations in Shoreline Soil at the NWS Area, 2006 and 2007
Post-remediation Sampling Events**



5.0 REFERENCES

- Battelle, 2008. *Sediment Monitoring Summary Report 2007 Remedial Dredging, Environmental Monitoring, Sampling, and Analysis, New Bedford Harbor Superfund Site*. Prepared under Contract DACW33-03-D-0004 Task Order No 00222 for the U.S. Army Corps of Engineers New England District, Concord, MA. June.
- Battelle, 2006a. *Environmental Monitoring, Sampling, and Analysis Quality Assurance Project Plan Addendum New Bedford Harbor Superfund Site, New Bedford, Massachusetts*. Prepared under Contract DACW33-03-D-0004 Task Order No 0022 for the U.S. Army Corps of Engineers New England District, Concord, MA. July.
- Battelle, 2006b. *Sediment Monitoring Field Sampling Plan New Bedford Harbor Superfund Site, New Bedford, Massachusetts*. Prepared under Contract DACW33-03-D-0004 Task Order No 0022 for the U.S. Army Corps of Engineers New England District, Concord, MA. July.
- Battelle, 2006c. *North of Wood St. Technical Memorandum New Bedford Harbor Superfund Site, New Bedford, Massachusetts*. Prepared under Contract DACW33-03-D-0004 Task Order No 0022 for the U.S. Army Corps of Engineers New England District, Concord, MA. October.
- ENSR Corporation. 2006. *2005 Monitoring Summary Report; North of Wood Street Area Sampling*. Prepared Under USACE Contract No. Dacw33-00-D-0003 Task 012. U.S. Army Corps of Engineers New England District Concord, Massachusetts. March.
- Tetra Tech FW, Inc. 2004. *North of Wood Street Confirmatory Sampling Report, New Bedford Harbor Superfund Site*. August.

Appendix A

Sediment Sampling Logs and Core Photographs

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Project #: G606422
Vessel: R/V Gale Force
Chief Scientist: Theresa Himmer

Station ID:	05-07-NWS-36-10	Time On Station:	1209	All measurements are ± 0.1 feet	
Core Sample ID:	5-070-NWS-36-10	Northing (NAD 83):	3708761.6	Water Depth (A):	
Logged by:	MW	Easting (NAD 83):	815516.2	Length of push core assembly (B):	
Collection Mechanism:	Rush Core Auger	GPS Accuracy:	2.04	Water surface to top of handle (C):	A
Date:	11/8/07	Predicted Tide (ft):	NA	Length of core (from bottom) (D):	1.0
		Time of Collection:	1212	Surveyed elevation (NVGD 29) (E):	NA
		Time Depart Station:	1218	Water surface from surveyed elevation (F):	

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
- (H) Elevation of the bottom of the core (NVGD): $G - (B \cdot C)$
- (z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
- (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
- (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
- (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

[illegible]

File ID of digital photograph(s):

Comments:

① + hauled + subsampled on 12/6/07 JMF/ALW

* Station ID: NWS-36, AEM 12/11/67
Core sample ID: S-07D-NWS-36-00-10

[illegible]

Page of

② Station ID: C007-030 E Page ____ of ____
AEM 12/11/07
Core Sample ID: S-070-C007-030 E-00-10

[illegible]

[illegible]

Page of

[illegible]

[illegible]

[illegible]

Battelle <small>The Business of Innovation</small>		Project Name: New Bedford Harbor Environmental Monitoring				Project #: G606422	
		Location: New Bedford, MA				Vessel: R/V Gale Force	
		Client: USACE NAE				Chief Scientist:	

Station ID: <u>C007-010</u>	Time On Station: <u>0953</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-C007-010-00-06</u>	Northing (NAD 83): <u>2709127.5</u>	Water Depth (A): <u>464.3</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815353.5</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.30</u>	Water surface to top of handle (C): <u>2.1</u>	
Date: <u>11/14/07</u>	Predicted Tide (ft): _____	Length of core (from bottom) (D): <u>0.6</u>	
	Time of Collection: <u>1028</u>	Surveyed elevation (NVGD 29) (E): _____	
	Time Depart Station: <u>1031</u>	Water surface from surveyed elevation (F): _____	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ _____

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ _____

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ _____

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ _____

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ _____

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
0.6		sand and gravel	gray black	loose	fine to large			Some fines in upper half of core S-07D-C007-010-00-05 PCB ^① TOP. S'
0.0								S-07D-C007-010-05-10 Archived Frozen S-07D-C007-010-05-07

File ID of digital photograph(s): _____
 Comments:

① Handed + subsampled on 12/6/07 DMF/MW

[illegible]

Water surface from surveyed elevation (F):

Battelle

The Business of Innovation

Project Name: New Bedford Harbor Environmental Monitoring

Location: New Bedford, MA

Client: USACE NAE

Project #: G606422

Vessel: R/V Gale Force

Chief Scientist:

Station ID: C007-033

Time On Station: 1129

All measurements are ±0.1 feet

Core Sample ID: S-07D-C007-033-00-11

Northing (NAD 83): 2708614.23

Water Depth (A): 3.3'

Logged by: MW

Easting (NAD 83): 815412.05

Length of push core assembly (B): 8.0

Collection Mechanism: Push-Core

GPS Accuracy: 2.84

Water surface to top of handle (C): 3.6

Date: 11/12/07

Predicted Tide (ft):

Length of core (from bottom) (D): 1.1

Time of Collection: 1133

Surveyed elevation (NVGD 29) (E):

Time Depart Station: 1140

Water surface from surveyed elevation (F):

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): E - F

(H) Elevation of the bottom of the core (NVGD): G - (B - C)

(Z*) Elevation of visual transition (NVGD): H + (distance to visual transition)

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): H + D

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): G - A

(Note if I ≠ I₂ within ± 1.0 feet, discard and resample)

	Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.1			Silt w organic material	Black	loose	fine	H ₂ S		S-07D-C007-033-00-05
0.6			Fine to med. silt	olive	Firm	med			FCB
0.0			Brown sand	Brown					S-07D-C007-033-05-11
									Archive Frozen

File ID of digital photograph(s):

Comments: ① Thawed + subsampled 12/7/07 JMF/ALW

Battelle <small>The Business of Innovation</small>		Project Name: <u>New Bedford Harbor Environmental Monitoring</u>				Project #: <u>G606422</u>	
		Location: <u>New Bedford, MA</u>				Vessel: <u>R/V Gale Force</u>	
		Client: <u>USACE NAE</u>				Chief Scientist:	

Station ID: <u>C007-062</u>	Time On Station: <u>0845</u>	All measurements are ± 0.1 feet	
Core Sample ID: <u>S-07D-C007-062-0009</u>	Northing (NAD 83): <u>2708165.1</u>	Water Depth (A): <u>4.5</u>	
Logged by: <u>MW</u>	Easting (NAD 83): <u>815565.6</u>	Length of push core assembly (B): <u>8.0</u>	
Collection Mechanism: <u>Push-Core</u>	GPS Accuracy: <u>2.94</u>	Water surface to top of handle (C): <u>2.3</u>	
Date: <u>11/14/2007</u>	Predicted Tide (ft):	Length of core (from bottom) (D): <u>0.9</u>	
	Time of Collection: <u>0850</u>	Surveyed elevation (NVGD 29) (E):	
	Time Depart Station: <u>0851</u>	Water surface from surveyed elevation (F):	

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$

(Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (I.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
<u>0.9</u> <u>0.7</u> <u>0.0</u>		<u>Silt</u> <u>Clay and Silt</u>	<u>Black</u> <u>Olive gray with Black</u>	<u>loose</u> <u>firm</u>	<u>fine</u> <u>fine</u>			<u>S-07D-C007-062-00-05</u> <u>① PCB</u> <u>Possible mixed</u> <u>Clay and Silt</u> <u>below 0.7</u> <u>S-07D-C007-062-05-1.0</u> <u>Archive Frozen</u>

File ID of digital photograph(s):

Comments:

① QA Split taken here

thawed + subsampled 12/7/07

JME/MW

Station ID: C007-055 Time On Station: 0856 All measurements are ± 0.1 feet
 Core Sample ID: S-07D-C007-055-00-1.5 Northing (NAD 83): 3708267.8 Water Depth (A): 6.3'
 Logged by: NW Easting (NAD 83): 815460.2 Length of push core assembly (B): 9.0
 Collection Mechanism: Push-Core GPS Accuracy: 4.70 Water surface to top of handle (C): 1.0
 Date: 11/14/07 Predicted Tide (ft): _____ Length of core (from bottom) (D): 1.5
 Time of Collection: 0904 Surveyed elevation (NVGD 29) (E): _____
 Time Depart Station: 0906 Water surface from surveyed elevation (F): _____

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
 (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.5		Silt	Black	loose	fine			S-07D-C007-055-00-01
0.7		Clay sand shells	olive gray	firm	fine med			PCB ^① silt streaks
0.0								S-07D-C007-055-05-15 Archive Frozen

File ID of digital photograph(s):

Comments:

① Thawed + subsampled 12/2/07 JMF/NW

Battelle The Business of Innovation		Project Name: New Bedford Harbor Environmental Monitoring		Project #: G606422	
Location: New Bedford, MA		Client: USACE NAE		Vessel: R/V Gale Force	
				Chief Scientist:	

Station ID: C007-048	Time On Station: 0913	All measurements are ±0.1 feet			
Core Sample ID: S-07D-C007-048-00-12	Northing (NAD 83): 2708385.1	Water Depth (A): 5.3			
Logged by: MW	Easting (NAD 83): 815413.7	Length of push core assembly (B): 8.0			
Collection Mechanism: Push-Core	GPS Accuracy: 3.32	Water surface to top of handle (C): 1.5			
Date: 11/14/07	Predicted Tide (ft): _____	Length of core (from bottom) (D): 1.2			
	Time of Collection: 0916	Surveyed elevation (NVGD 29) (E): _____			
	Time Depart Station: 0920	Water surface from surveyed elevation (F): _____			

Calculations for Determination of Z* Elevation

(G) Elevation of Water Surface (NVGD): $E - F$ _____

(H) Elevation of the bottom of the core (NVGD): $G - (B - C)$ _____

(Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$ _____

(I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$ _____

(I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$ _____

(Note if I ≠ I₂ within ± 1.0 feet, discard and resample) _____

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		Silt and organic detritus	Black	loose fibrous	fine to med			S-07D-C007-048-00-05
0.4								PCB®
0.0		clay and organic detritus	Olive gray	Firm	fine to med			S-07D-C007-048-05-12
								Archive Frozen

File ID of digital photograph(s): _____

Comments:
 Could not get exactly on station due to Wood St. Bridge and Sediment Traps.
 ① Thawed + subsampled 12/7/07 JMF/mw

Page _____ of _____

Station ID: C007-049-DUP Time On Station: 0926 All measurements are ± 0.1 feet
 Core Sample ID: S-07D-049-DUP-00-1.2 Northing (NAD 83): 2708402.5 Water Depth (A): 5.3
 Logged by: MW Easting (NAD 83): 815468.1 Length of push core assembly (B): 8.0
 Collection Mechanism: Push-Core GPS Accuracy: 3.94 Water surface to top of handle (C): 1.2
 Date: 11/14/07 Predicted Tide (ft): _____ Length of core (from bottom) (D): 1.2
 Time of Collection: 0937 Surveyed elevation (NVGD 29) (E): _____
 Time Depart Station: 0942 Water surface from surveyed elevation (F): _____

Calculations for Determination of Z* Elevation

- (G) Elevation of Water Surface (NVGD): $E - F$
 (H) Elevation of the bottom of the core (NVGD): $G - (B - C)$
 (Z*) Elevation of visual transition (NVGD): $H + (\text{distance to visual transition})$
 (I) Elevation of the sediment-water interface as measured from bottom of core (NVGD): $H + D$
 (I₂) Elevation of the sediment-water interface as measured from water depth (NVGD): $G - A$
 (Note if I \neq I₂ within ± 1.0 feet, discard and resample)

Elevation (NVGD) (i.e. Bottom = H)	Lithology - Include USCS code	Type	Color	Consistency	Maximum particle size	Odor	Sample IDs	Comments
1.2		Silt	Black	loose	fine			S-07D-C007-049-DUP-00-0
0.8		Clay	olive gray	firm	fine			PCB ^①
0.0								S-07D-C007-049-DUP-05
								Archive Frozen

File ID of digital photograph(s):

Comments:

① Thawed + subsampled 12/7/07 SMF/MW

Calculations for Determination of Z* Elevation

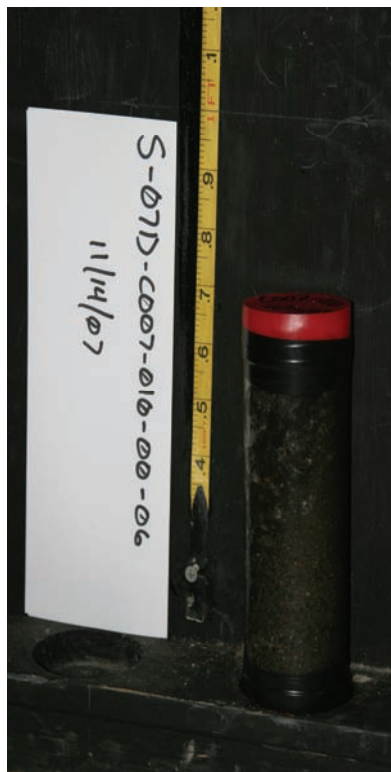
(Note if $l \neq l_2$ within ± 1.0 feet, discard and resample)

Comments:

* QA Spit Taken

Page 1 of 1

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C007-010



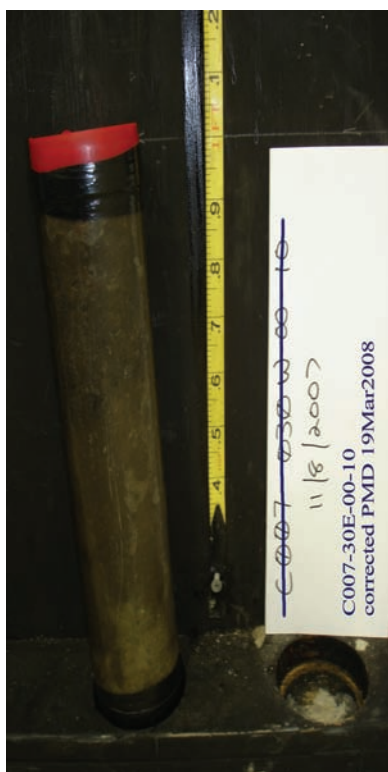
C007-016



C007-023



C007-028



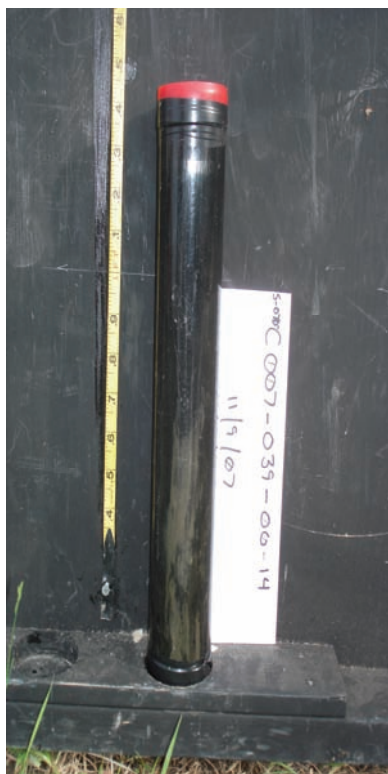
C007-30E



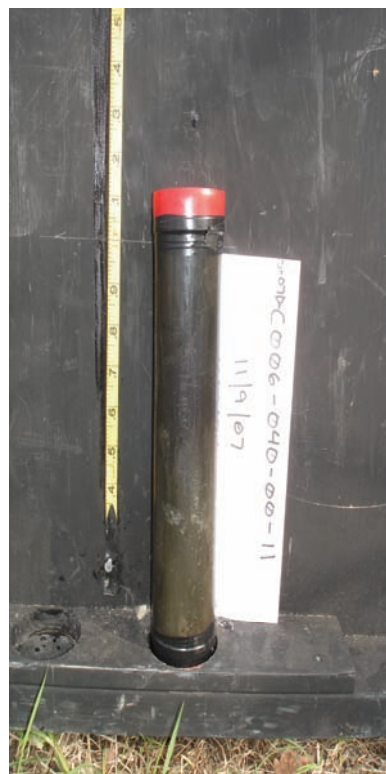
C007-030W



C007-038



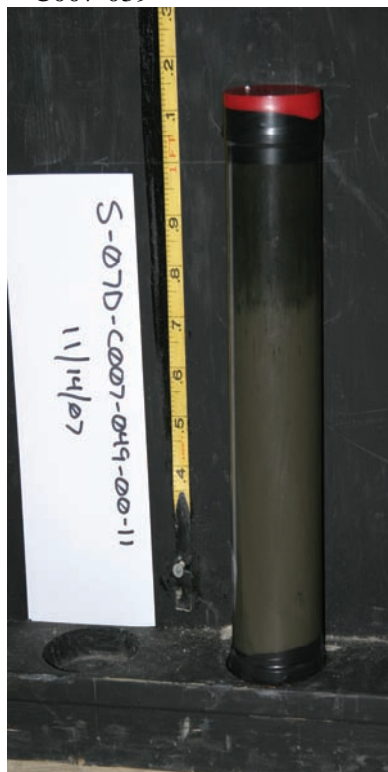
C007-039



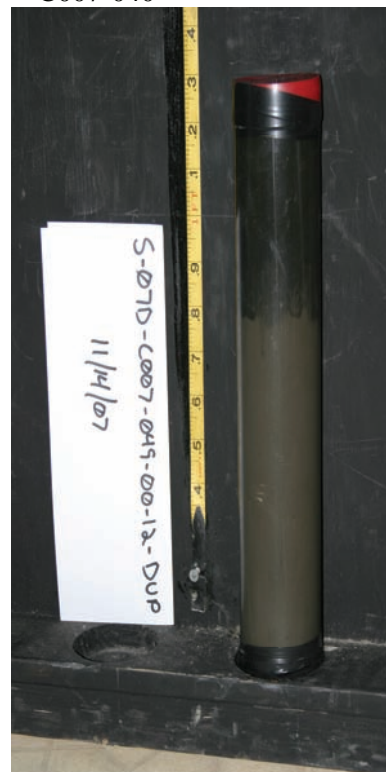
C007-040



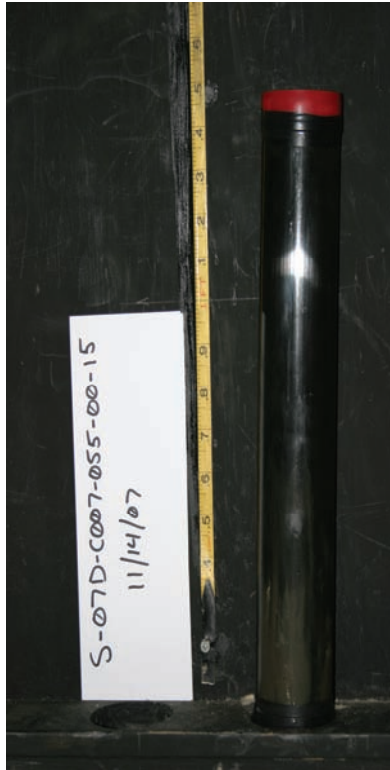
C007-048



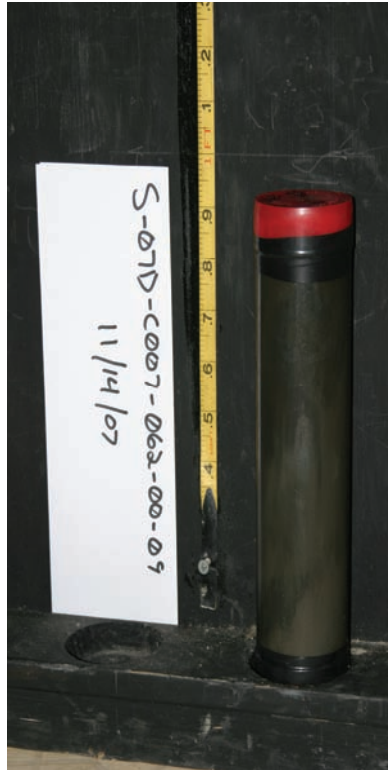
C007-049



C007-049 duplicate



C007-055



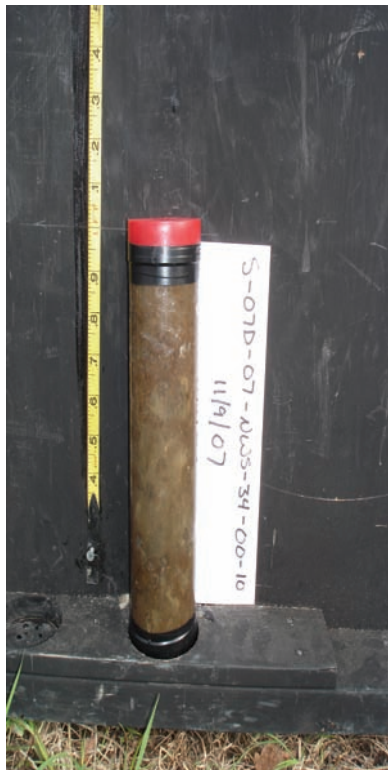
C007-062



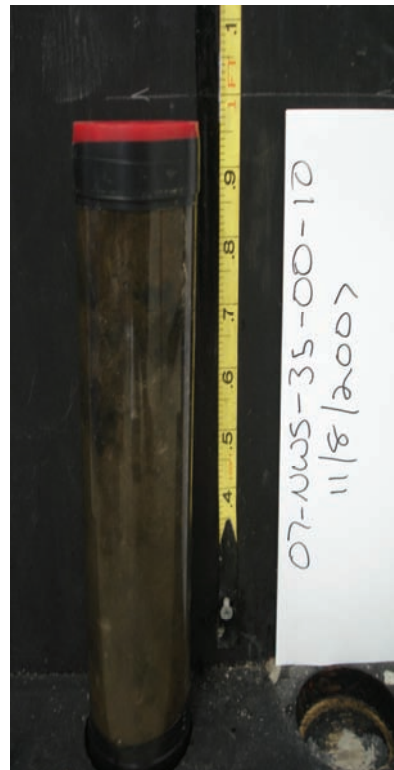
C007-033



07-NWS-033



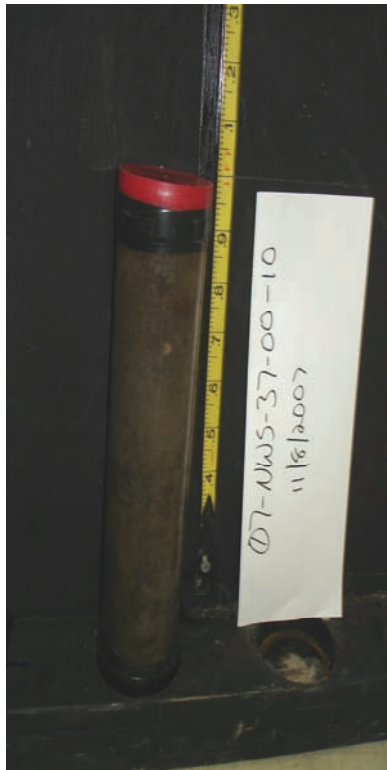
07-NWS-34



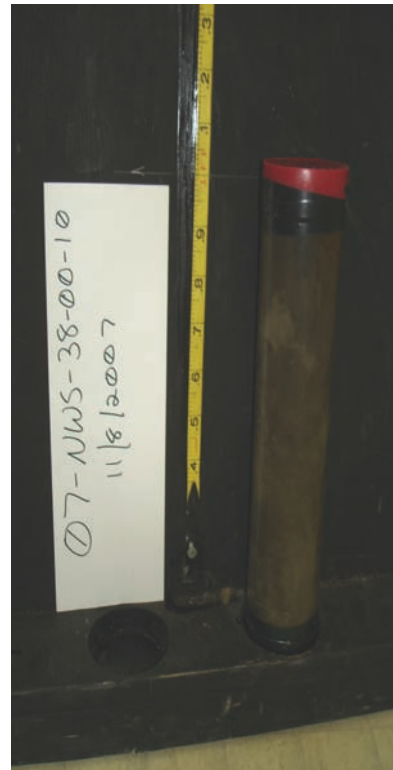
07-NWS-35



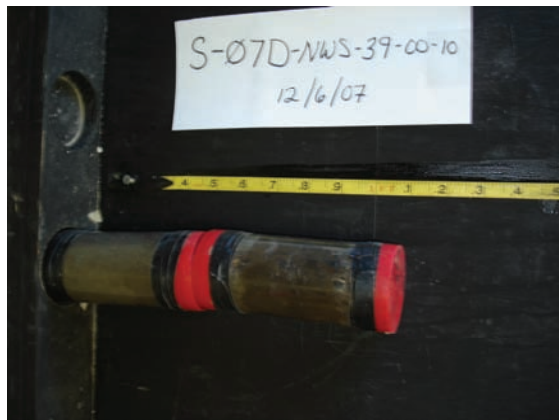
07-NWS-36



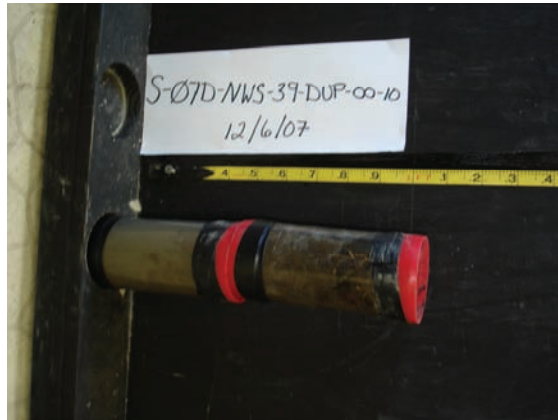
07-NWS-37



07-NWS-38



07-NWS-39



07-NWS-39 duplicate

Appendix B

PCB Analytical Data

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APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	07-NWS-35			07-NWS-36			07-NWS-37			07-NWS-38		
Collection Date	11/8/2007			11/8/2007			11/8/2007			11/8/2007		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-NWS-35-00-05			S-07D-NWS-36-00-05			S-07D-NWS-37-00-05			S-07D-NWS-38-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.0033	MG/KG_DRYWT	D	0.0098	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.0032	MG/KG_DRYWT	D
2,2',5-Tricb (PCB 18)	0.0056	MG/KG_DRYWT	D	0.016	MG/KG_DRYWT	D	0.072	MG/KG_DRYWT	D	0.0069	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.0086	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D	0.174	MG/KG_DRYWT	D	0.013	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.0047	MG/KG_DRYWT	D	0.0078	MG/KG_DRYWT	D	0.078	MG/KG_DRYWT	D	0.0071	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.012	MG/KG_DRYWT	D	0.02	MG/KG_DRYWT	D	0.308	MG/KG_DRYWT	D	0.018	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.0045	MG/KG_DRYWT	D	0.0049	MG/KG_DRYWT	D	0.233	MG/KG_DRYWT	D	0.007	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.006	MG/KG_DRYWT	D	0.0063	MG/KG_DRYWT	D	0.193	MG/KG_DRYWT	Dp	0.0081	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.0017	MG/KG_DRYWT	D	0.0021	MG/KG_DRYWT	Dp	0.024	MG/KG_DRYWT	Dp	0.002	MG/KG_DRYWT	D
2,3',4,4',5-Pentacb (PCB 118)	0.0074	MG/KG_DRYWT	D	0.0078	MG/KG_DRYWT	D	0.178	MG/KG_DRYWT	D	0.01	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.00068	MG/KG_DRYWT	D	0.00034	MG/KG_DRYWT	Dp	0.014	MG/KG_DRYWT	Dp	0.0011	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.0056	MG/KG_DRYWT	D	0.0054	MG/KG_DRYWT	D	0.182	MG/KG_DRYWT	D	0.0075	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.0081	MG/KG_DRYWT	D	0.0089	MG/KG_DRYWT	D	0.216	MG/KG_DRYWT	Dp	0.011	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.00052	MG/KG_DRYWT	Dp	0.00082	MG/KG_DRYWT	Dp	0.014	MG/KG_DRYWT	D	0.00098	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0032	MG/KG_DRYWT	Dp	0.0096	MG/KG_DRYWT	Dp	0.023	MG/KG_DRYWT	D	0.0023	MG/KG_DRYWT	Dp
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.00073	MG/KG_DRYWT	D	0.0015	MG/KG_DRYWT	D	0.011	MG/KG_DRYWT	DU	0.0013	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0002	MG/KG_DRYWT	DU	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	0.19	MG/KG_DRYWT		0.31	MG/KG_DRYWT		4.5	MG/KG_DRYWT		0.26	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	07-NWS-33			07-NWS-34			07-NWS-39			07-NWS-39		
Collection Date	11/9/2007			11/9/2007			12/6/2007			12/6/2007		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			REP		
Samp ID	S-07D-NWS-033-00-05			S-07D-NWS-034-00-05			S-07D-NWS-039-00-05			S-07D-NWS-039-DUP-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.00063	MG/KG_DRYWT	Dp	0.062	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0005	MG/KG_DRYWT	Dp
2,2',5-Tricb (PCB 18)	0.0024	MG/KG_DRYWT	D	0.156	MG/KG_DRYWT	D	0.00052	MG/KG_DRYWT	Dp	0.0015	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.0048	MG/KG_DRYWT	D	0.274	MG/KG_DRYWT	D	0.0013	MG/KG_DRYWT	D	0.0029	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.0019	MG/KG_DRYWT	D	0.163	MG/KG_DRYWT	D	0.00071	MG/KG_DRYWT	Dp	0.0013	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.0076	MG/KG_DRYWT	D	0.364	MG/KG_DRYWT	D	0.0036	MG/KG_DRYWT	Dp	0.0051	MG/KG_DRYWT	Dp
2,3',4,4'-Tetracb (PCB 66)	0.0015	MG/KG_DRYWT	D	0.225	MG/KG_DRYWT	D	0.00093	MG/KG_DRYWT	Dp	0.0017	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.002	MG/KG_DRYWT	D	0.372	MG/KG_DRYWT	D	0.00078	MG/KG_DRYWT	D	0.0016	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.0056	MG/KG_DRYWT	Dp	0.127	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	UJ	0.00036	MG/KG_DRYWT	Dp
2,3',4,4',5-Pentacb (PCB 118)	0.0032	MG/KG_DRYWT	D	0.381	MG/KG_DRYWT	D	0.0019	MG/KG_DRYWT	D	0.0028	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.0002	MG/KG_DRYWT	DU	0.058	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.0019	MG/KG_DRYWT	D	0.338	MG/KG_DRYWT	D	0.0013	MG/KG_DRYWT	D	0.002	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.0029	MG/KG_DRYWT	D	0.242	MG/KG_DRYWT	D	0.002	MG/KG_DRYWT	D	0.003	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.0002	MG/KG_DRYWT	DU	0.022	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0002	MG/KG_DRYWT	DU	0.035	MG/KG_DRYWT	D	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.0002	MG/KG_DRYWT	DU	0.0082	MG/KG_DRYWT	DpJ	0.0003	MG/KG_DRYWT	Dp	0.00031	MG/KG_DRYWT	Dp
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.0002	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.0002	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.0002	MG/KG_DRYWT	DU	0.01	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU	0.0002	MG/KG_DRYWT	DU
Total MonoCB				0.042	MG/KG_DRYWT	U						
Total DiCB				0.274	MG/KG_DRYWT							
Total TriCB				1.064	MG/KG_DRYWT							
Total TetraCB				1.756	MG/KG_DRYWT							
Total PentaCB				2.188	MG/KG_DRYWT							
Total HexaCB				1.365	MG/KG_DRYWT							
Total HeptaCB				0.265	MG/KG_DRYWT	J						
Total OctaCB				0.209	MG/KG_DRYWT	U						
Total NonaCB				0.063	MG/KG_DRYWT	U						
DecaCB				0.021	MG/KG_DRYWT	DU						
Total PCB Congeners (sum CONG x 2.6)	0.089	MG/KG_DRYWT		7.4	MG/KG_DRYWT		0.035	MG/KG_DRYWT		0.06	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)				6.9	MG/KG_DRYWT							

APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	C007-030E			C007-016			C007-023			C007-028		
Collection Date	11/8/2007			11/9/2007			11/9/2007			11/9/2007		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-C007-030E-00-05			S-07D-C007-016-00-05			S-07D-C007-023-00-05			S-07D-C007-028-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.0037	MG/KG_DRYWT	D	0.692	MG/KG_DRYWT	D	0.575	MG/KG_DRYWT	D	1.821	MG/KG_DRYWT	D
2,2',5-Tricb (PCB 18)	0.0098	MG/KG_DRYWT	D	1.505	MG/KG_DRYWT	D	1.113	MG/KG_DRYWT	D	4.292	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.022	MG/KG_DRYWT	D	2.225	MG/KG_DRYWT	D	1.789	MG/KG_DRYWT	D	6.163	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.011	MG/KG_DRYWT	D	0.883	MG/KG_DRYWT	D	0.663	MG/KG_DRYWT	D	2.474	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.031	MG/KG_DRYWT	D	2.693	MG/KG_DRYWT	D	2.14	MG/KG_DRYWT	D	8.212	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.0093	MG/KG_DRYWT	D	0.423	MG/KG_DRYWT	D	0.334	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,2',4,5,5'-Pentacb (PCB 101)	0.015	MG/KG_DRYWT	D	0.733	MG/KG_DRYWT	D	0.611	MG/KG_DRYWT	D	2.235	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.011	MG/KG_DRYWT	Dp	0.057	MG/KG_DRYWT	D	0.039	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,3',4,4',5-Pentacb (PCB 118)	0.017	MG/KG_DRYWT	D	0.537	MG/KG_DRYWT	D	0.455	MG/KG_DRYWT	D	1.533	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.002	MG/KG_DRYWT	D	0.032	MG/KG_DRYWT	D	0.019	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.013	MG/KG_DRYWT	D	0.407	MG/KG_DRYWT	D	0.321	MG/KG_DRYWT	D	0.955	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.02	MG/KG_DRYWT	D	0.74	MG/KG_DRYWT	D	0.608	MG/KG_DRYWT	D	2.216	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.0016	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	D	0.034	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.0023	MG/KG_DRYWT	D	0.069	MG/KG_DRYWT	D	0.052	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.0019	MG/KG_DRYWT	D	0.087	MG/KG_DRYWT	D	0.066	MG/KG_DRYWT	D	0.111	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.111	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.111	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.00019	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.111	MG/KG_DRYWT	DU
Total MonoCB				0.021	MG/KG_DRYWT	J						
Total DiCB				2.024	MG/KG_DRYWT							
Total TriCB				9.87	MG/KG_DRYWT							
Total TetraCB				9.222	MG/KG_DRYWT							
Total PentaCB				5.299	MG/KG_DRYWT							
Total HexaCB				2.495	MG/KG_DRYWT							
Total HeptaCB				0.487	MG/KG_DRYWT	J						
Total OctaCB				0.124	MG/KG_DRYWT	J						
Total NonaCB				0.084	MG/KG_DRYWT	U						
DecaCB				0.028	MG/KG_DRYWT	DU						
Total PCB Congeners (sum CONG x 2.6)	0.44	MG/KG_DRYWT		29	MG/KG_DRYWT		23	MG/KG_DRYWT		78	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)				30	MG/KG_DRYWT							

APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	C007-030W			C007-038			C007-039			C007-040		
Collection Date	11/9/2007			11/9/2007			11/9/2007			11/9/2007		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-C007-030W-00-05			S-07D-C007-038-00-05			S-07D-C007-039-00-05			S-07D-C007-040-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.0028	MG/KG_DRYWT	D	1.697	MG/KG_DRYWT	D	5.626	MG/KG_DRYWT	D	0.422	MG/KG_DRYWT	D
2,2',5-Tricb (PCB 18)	0.011	MG/KG_DRYWT	D	3.905	MG/KG_DRYWT	D	13.88	MG/KG_DRYWT	D	0.913	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	0.019	MG/KG_DRYWT	D	5.388	MG/KG_DRYWT	D	21.68	MG/KG_DRYWT	D	1.469	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.011	MG/KG_DRYWT	D	2.098	MG/KG_DRYWT	D	8.93	MG/KG_DRYWT	D	0.661	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	0.03	MG/KG_DRYWT	D	7.873	MG/KG_DRYWT	D	27.82	MG/KG_DRYWT	D	2.014	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.0093	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.28	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.013	MG/KG_DRYWT	D	1.952	MG/KG_DRYWT	D	7.341	MG/KG_DRYWT	D	0.552	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.0092	MG/KG_DRYWT	Dp	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.031	MG/KG_DRYWT	D
2,3',4,4',5-Pentacb (PCB 118)	0.017	MG/KG_DRYWT	D	1.338	MG/KG_DRYWT	D	5.175	MG/KG_DRYWT	D	0.395	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.00065	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.016	MG/KG_DRYWT	D
2,2',3,4,4',5'-Hexacb (PCB 138)	0.009	MG/KG_DRYWT	D	0.108	MG/KG_DRYWT	DU	3.809	MG/KG_DRYWT	D	0.305	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.017	MG/KG_DRYWT	D	1.929	MG/KG_DRYWT	D	8.016	MG/KG_DRYWT	D	0.557	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.0013	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.032	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.002	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.046	MG/KG_DRYWT	D
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.0021	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.061	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.00019	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.00019	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.00019	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.22	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB							0.088	MG/KG_DRYWT				
Total DiCB							10.98	MG/KG_DRYWT				
Total TriCB							53.51	MG/KG_DRYWT				
Total TetraCB							49.19	MG/KG_DRYWT				
Total PentaCB							24.64	MG/KG_DRYWT				
Total HexaCB							13.87	MG/KG_DRYWT				
Total HeptaCB							2.305	MG/KG_DRYWT				
Total OctaCB							0.438	MG/KG_DRYWT				
Total NonaCB							0.152	MG/KG_DRYWT				
DecaCB							0.032	MG/KG_DRYWT	D			
Total PCB Congeners (sum CONG x 2.6)	0.4	MG/KG_DRYWT		68	MG/KG_DRYWT		270	MG/KG_DRYWT		20	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)							160	MG/KG_DRYWT				

APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	C007-033			C007-010			C007-048			C007-049		
Collection Date	11/12/2007			11/14/2007			11/14/2007			11/14/2007		
Fraction	TOTAL			TOTAL			TOTAL			TOTAL		
QC Code	SA			SA			SA			SA		
Samp ID	S-07D-C007-033-00-05			S-07D-C007-010-00-05			S-07D-C007-048-00-05			S-07D-C007-049-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	2.739	MG/KG_DRYWT	D	0.123	MG/KG_DRYWT	D	0.107	MG/KG_DRYWT	DU	0.531	MG/KG_DRYWT	D
2,2',5-Tricb (PCB 18)	6.038	MG/KG_DRYWT	D	0.293	MG/KG_DRYWT	D	2.685	MG/KG_DRYWT	D	1.102	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	9.954	MG/KG_DRYWT	D	0.371	MG/KG_DRYWT	D	4.34	MG/KG_DRYWT	D	1.886	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	3.47	MG/KG_DRYWT	D	0.154	MG/KG_DRYWT	D	1.576	MG/KG_DRYWT	D	0.758	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	12.33	MG/KG_DRYWT	D	0.375	MG/KG_DRYWT	D	5.218	MG/KG_DRYWT	D	2.511	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	1.194	MG/KG_DRYWT	D	0.088	MG/KG_DRYWT	Dp	0.107	MG/KG_DRYWT	DU	0.321	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	3.298	MG/KG_DRYWT	D	0.094	MG/KG_DRYWT	D	1.466	MG/KG_DRYWT	D	0.662	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.227	MG/KG_DRYWT	DU	0.0051	MG/KG_DRYWT	DpJ	0.107	MG/KG_DRYWT	DU	0.031	MG/KG_DRYWT	D
2,3',4,4',5-Pentacb (PCB 118)	2.185	MG/KG_DRYWT	D	0.08	MG/KG_DRYWT	D	0.109	MG/KG_DRYWT	DU	0.476	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.018	MG/KG_DRYWT	Dp
2,2',3,4,4',5'-Hexacb (PCB 138)	1.306	MG/KG_DRYWT	D	0.05	MG/KG_DRYWT	D	0.109	MG/KG_DRYWT	DU	0.344	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	3.201	MG/KG_DRYWT	D	0.092	MG/KG_DRYWT	D	1.317	MG/KG_DRYWT	D	0.668	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.034	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.055	MG/KG_DRYWT	D
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.08	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.227	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU	0.107	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB												
Total DiCB												
Total TriCB												
Total TetraCB												
Total PentaCB												
Total HexaCB												
Total HeptaCB												
Total OctaCB												
Total NonaCB												
DecaCB												
Total PCB Congeners (sum CONG x 2.6)	120	MG/KG_DRYWT		4.5	MG/KG_DRYWT		43	MG/KG_DRYWT		25	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)												

APPENDIX B

2007 North of Wood Street Sediment Analytical Results

Station ID	C007-049			C007-055			C007-062		
Collection Date	11/14/2007			11/14/2007			11/14/2007		
Fraction	TOTAL			TOTAL			TOTAL		
QC Code	REP			SA			SA		
Samp ID	S-07D-C007-049-DUP-00-05			S-07D-C007-055-00-05			S-07D-C007-062-00-05		
Analyte	Result	Unit	FinQ	Result	Unit	FinQ	Result	Unit	FinQ
2,4'-Dicb (PCB 8)	0.641	MG/KG_DRYWT	D	3.9	MG/KG_DRYWT	D	0.813	MG/KG_DRYWT	D
2,2',5-Tricb (PCB 18)	1.466	MG/KG_DRYWT	D	9.534	MG/KG_DRYWT	D	1.864	MG/KG_DRYWT	D
2,4,4'-Tricb (PCB 28)	2.473	MG/KG_DRYWT	D	15.28	MG/KG_DRYWT	D	1.795	MG/KG_DRYWT	D
2,2',3,5'-Tetracb (PCB 44)	0.98	MG/KG_DRYWT	D	5.854	MG/KG_DRYWT	D	0.295	MG/KG_DRYWT	D
2,2',5,5'-Tetracb (PCB 52)	3.123	MG/KG_DRYWT	D	20.33	MG/KG_DRYWT	D	2.545	MG/KG_DRYWT	D
2,3',4,4'-Tetracb (PCB 66)	0.419	MG/KG_DRYWT	D	1.304	MG/KG_DRYWT	D	0.14	MG/KG_DRYWT	D
2,2',4,5,5'-Pentacb (PCB 101)	0.834	MG/KG_DRYWT	D	5.164	MG/KG_DRYWT	D	0.334	MG/KG_DRYWT	D
2,3,3',4,4'-Pentacb (PCB 105)	0.052	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	DU	0.0034	MG/KG_DRYWT	DpJ
2,3',4,4',5-Pentacb (PCB 118)	0.602	MG/KG_DRYWT	D	3.352	MG/KG_DRYWT	D	0.24	MG/KG_DRYWT	D
2,2',3,3',4,4'-Hexacb (PCB 128)	0.032	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,4,4',5'-Hexacb (PCB 138)	0.446	MG/KG_DRYWT	D	2.51	MG/KG_DRYWT	D	0.167	MG/KG_DRYWT	D
2,2',4,4',5,5'-Hexacb (PCB 153)	0.844	MG/KG_DRYWT	D	5.44	MG/KG_DRYWT	D	0.447	MG/KG_DRYWT	D
2,2',3,3',4,4',5-Heptacb (PCB 170)	0.053	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	DU	0.019	MG/KG_DRYWT	D
2,2',3,4,4',5,5'-Heptacb (PCB 180)	0.083	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	DU	0.028	MG/KG_DRYWT	D
2,2',3,4',5,5',6-Heptacb (PCB 187)	0.115	MG/KG_DRYWT	D	0.23	MG/KG_DRYWT	DU	0.037	MG/KG_DRYWT	D
2,2',3,3',4,4',5,6-Octacb (PCB 195)	0.01	MG/KG_DRYWT	DU	0.23	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
2,2',3,3',4,4',5,5',6-Nonacb (PCB 206)	0.01	MG/KG_DRYWT	DU	0.23	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Decacb - Congener (PCB 209)	0.01	MG/KG_DRYWT	DU	0.23	MG/KG_DRYWT	DU	0.011	MG/KG_DRYWT	DU
Total MonoCB									
Total DiCB									
Total TriCB									
Total TetraCB									
Total PentaCB									
Total HexaCB									
Total HeptaCB									
Total OctaCB									
Total NonaCB									
DecaCB									
Total PCB Congeners (sum CONG x 2.6)	32	MG/KG_DRYWT		190	MG/KG_DRYWT		23	MG/KG_DRYWT	
Total PCB Homologues (sum HOM)									

APPENDIX B

PCB Data Qualifiers

Qualifiers:

B	Analyte concentration found in the sample at $< 5 \times$ the level detected in the procedural blank
D	Dilution run. Initial run outside linear range of instrument
E	Estimate, result is greater than the highest concentration level in the calibration
H	Surrogate diluted out. Used when surrogate recovery is affected by excessive dilution of the sample extract
J	Analyte detected below the sample specific reporting limit
ME	Significant Matrix Interference - Estimated value
N	Quality Control value is outside the accuracy or precision data quality objective (DQO)
NA	Not applicable
T	Holding time exceeded
U	Analyte not detected at 3:1 signal:noise ratio. Reporting limit is reported.
p	The relative percent difference (RPD) between the values obtained from the dual columns is $>40\%$.



Technical Memorandum

Date: June 20, 2008
To: Robert Leitch, USACE North Atlantic Division New England District
From: Deirdre Dahlen, Battelle
Subject: Sawyer Street 2007 Semi-annual Groundwater Monitoring Results

This Technical Memorandum presents a summary of the groundwater monitoring activities conducted at the Sawyer Street Confined Disposal Facility (CDF) in New Bedford, Massachusetts during the 2007 semi-annual monitoring period. The 2007 monitoring study is a continuation of a multi-year groundwater sampling program to sample six groundwater wells located at the perimeter of the CDF. Results from the monitoring study are used to assess potential trends in concentrations of polychlorinated biphenyls (PCBs as Aroclor) and selected metals (cadmium, chromium, copper, and lead) and to evaluate the integrity of the CDF. Groundwater well development and results from monitoring conducted since 2001 are presented in ENSR (2006). Results from the 2007 semi-annual monitoring study are discussed in this Technical Memorandum.

Field Activity Summary

Sampling was conducted in the early summer and fall of 2007, on June 28-29, 2007 and October 15-16, 2007. During both events, *in-situ* water quality measurements (temperature, specific conductivity, dissolved oxygen [DO], pH, Oxidative Redox Potential [ORP], turbidity), groundwater levels, and samples of groundwater were collected at six wells located at the perimeter of the CDF (Figure 1), identified as MW-1, MW-3, MW-4A, MW-5, MW-6, and MW-7A. All field measurements and groundwater collection were conducted according to the Field Sampling Plan (FSP) developed for this investigation (Battelle, 2006). Field activities are summarized briefly below.

Groundwater sampling was performed according to the procedures for Low-Flow (Low-Stress) Purging and Sampling based on EPA Region I Low Stress (flow) Purging and Sampling Groundwater Procedure for the Collection of Groundwater Samples from Monitoring Wells, Rev. 2, July 30, 1996 (EPA, 1996). A Geotech GeoPump II Peristaltic Pump was used during the June 2007 sampling event and a bladder pump (equipped with dedicated Teflon bladders) was used during the October 2007 event. Dedicated sampling tubing was used to collect groundwater samples during both events to minimize the risk of sample contamination and cross contamination between wells. Upon arrival for sample collection, the water level was measured with a cleaned water level tape and the well volume was calculated. The water level tape was cleaned between wells following decontamination procedures described in the FSP (Battelle, 2006). The pump (peristaltic or bladder) was then affixed to the dedicated tubing which was placed into the well. The well depth was measured again before purging the well to account for any water displacement from the pump. Groundwater samples for PCB Aroclor and metals analysis were collected once the well was purged and all diagnostic parameters (i.e., pH, DO, specific conductivity, turbidity, temperature, and ORP) achieved a steady state. The flow rate was verified using a graduated cylinder and timepiece and then recorded on the field log sheets.

In addition to the field samples, field and laboratory quality control (QC) samples were collected to meet measurement quality objectives defined in the FSP. During each sampling event, one field duplicate sample and one equipment blank were collected; one matrix spike/matrix spike duplicate (MS/MSD) were also collected to provide 'extra' water for the preparation of laboratory-based QC samples.



Field measurements were recorded on detailed field logs sheets that are provided as an attachment to this Technical Memorandum (Appendix A). The integrity of the groundwater samples was maintained by using cleaned, dedicated sampling tubing for each well, by not introducing contaminants into the samples during collection, by collecting the samples in clean bottles provided by the analytical laboratories, by keeping the samples cold on ice during transport to the analytical laboratories, and by analyzing the samples within the required holding time.



Figure 1: Sawyer Street CDF Monitoring Well Locations and PCB Aroclor 1242 and 1248 Concentrations in Groundwater



***In-situ* Water Quality Summary**

Water quality parameters were measured during the initial pumping of groundwater from the wells before the actual groundwater sample collection. *In-situ* measurements were made using an YSI® multi-meter sonde and a flow-thru cell. The flow-thru cell was disconnected from the discharge line during the actual sample collection. The YSI® sonde was calibrated and used according to all manufacturer's specifications. Calibration records are documented on the field logs (Appendix A). Turbidity was measured using a LaMotte, 2020E turbidity meter. Once the diagnostic parameters had stabilized, sample collection was initiated. These data are summarized in Table 1.

Chemistry Water Quality Summary

The groundwater samples collected from the June and October 2007 sampling events were analyzed for PCB Aroclors and selected metals, including cadmium, chromium, copper, and lead. PCB Aroclor analysis was performed by Battelle, located in Duxbury, Massachusetts and metals analysis was performed by Battelle Marine Science Laboratory, located in Sequim, Washington. Sample results are summarized in Table 2 (PCB Aroclor) and Table 3 (metals), and are compared to the Massachusetts Contingency Plan (MCP), Method 1 category GW-3 criteria for groundwater that has a potential to discharge to a surface water body (http://www.mass.gov/dep/cleanup/laws/0974_2.htm).

Concentrations of PCB Aroclors were generally low or undetected in the groundwater samples. Aroclor 1242 was detected in 4 of the 6 wells (MW-1, MW-3, MW-4A, and MW-6) during the June 2007 event; Aroclor 1248 was detected in 3 of the 6 wells (MW-3, MW-4A, and MW-5) during the October 2007 event; and Aroclor 1260 was detected in 1 of the 6 wells (MW-7A) during the June 2007 event (Table 2). All PCB Aroclors were measured at levels below the MCP GW-3 criteria of 10 µg/L, which is consistent with earlier monitoring events conducted from 2004 to 2006 (ENSR, 2006). The June and October 2007 sampling results for Aroclor 1242 and 1248 are shown on Figure 1. Figure 1 shows that Aroclor 1242 detections are located in the western, northern, and eastern portions of the site, whereas Aroclor 1248 detections are observed in the eastern portion of the site only. The lone Aroclor 1260 detection was observed in MW-7A, which is located in the southern portion of the site where neither Aroclor 1242 nor Aroclor 1248 was detected.

Consistent with earlier monitoring events conducted since 2001 (ENSR, 2006), metals concentrations measured in the groundwater sampled in 2007 were below the MCP GW-3 criteria (Table 3). Cadmium was detected at low concentrations (0.018 to 0.718 µg/L) in groundwater collected at all 6 wells during the 2007 semi-annual monitoring, with the highest concentrations measured at well MW-7A. Chromium, copper, and lead were detected above the laboratory method detection limits in all the field samples. Due to the low-level background contamination (see Quality Control section), sample results for chromium, copper, and lead were "U" qualified during third party validation because the concentrations were below five times the concentrations in the equipment blanks.

Quality Control

Analytical data received third party validation and the data were qualified according to Region 1 Data Validation guidelines. Qualifiers reported on Tables 2 and 3 represent the final qualifier assigned by the data validator. Results from the field QC samples were also evaluated to assess data quality in terms of precision (field duplicate) and potential contamination (equipment blank) that may contribute to contaminant concentrations measured in the field samples, as follows.



Field Duplicates – PCB Aroclor and metals results were comparable between the original sample and the replicate sample collected at well MW-5 (June 2007 event) and at MW-4A (October 2007 event) (see Tables 2 and 3).

Equipment Blanks – PCB Aroclors were undetected in the equipment blanks, indicating that the sampling methods were free of PCB Aroclor contamination. Metals were detected in the equipment blanks (Table 3) at concentrations equal to or lower compared to earlier investigations (ENSR, 2006). Sample concentrations of cadmium were generally one order of magnitude higher compared to equipment blank concentrations, suggesting that the impact to data quality is minimal. Concentrations of chromium, copper, and lead in the groundwater samples were frequently less than five times the equipment blank concentrations, suggesting that sample concentrations for these metals may be biased high (sample values <5x equipment blank values are ‘U’ qualified on Table 3). While potential field contamination may have contributed to sample concentrations for chromium, copper, and lead, all metals concentrations in all of the groundwater samples are well below the MCP GW-3 criteria (Table 3).

Summary

Semi-annual monitoring was performed in 2007 at the Sawyer Street CDF as part of the ongoing groundwater monitoring program. Groundwater levels, water quality parameters, PCB Aroclor, and selected metals were monitored in all six wells at the facility. Analysis of groundwater samples indicates that although low-level detections of PCB Aroclor and metals were observed, concentrations are all below MCP GW-3 criteria. The groundwater data collected during the semi-annual monitoring suggest that the integrity of the CDF is currently maintained.

Literature Cited

Battelle, 2006. Groundwater Monitoring Final Field Sampling Plan-New Bedford, Massachusetts. Prepared by Battelle. June 2006.

ENSR, 2006. Final Sawyer Street Groundwater Report: New Bedford Harbor Superfund Site - New Bedford, Massachusetts. Prepared by ENSR Corporation. December 2006.

EPA, 1996. EPA Region I Low Stress (flow) Purging and Sampling Groundwater Procedure for the Collection of Groundwater Samples from Monitoring Wells, Rev. 2, July 30, 1996.

Massachusetts Department of Environmental Protection, 2008. MCP Method 1 Groundwater Standards. 310 CMR 40.0974(2). http://www.mass.gov/dep/cleanup/laws/0974_2.htm

Table 1: Summary of *In-situ* Groundwater Data Collected Immediately Prior to Sampling

Well ID	Date/ Time	Depth to Water (ft)	pH	Spec Cond. (µS/cm)	Temp (°C)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	Purge Vol. (L)	Flow Rate (mL/min)	Color/ Odor	Draw-down* (ft)
June 2007 Sampling Event												
MW-1	6/28/2007 17:55	17.7	7.19	848	18.17	2.12	5.6	-93.4	6.3	96	Clear	1.2
MW-3	6/28/2007 13:50	16.8	7.35	4322	15.58	0.18	7	-205.1	6.4	158	H2S Odor	1.7
MW-4A	6/28/2007 10:21	12.96	7.55	4518	17.39	0.39	1.8	-285.8	2.6	50	H2S Odor	2.11
MW-5	6/28/2007 12:48	13.0	7.93	3370	16.59	0.23	1.2	-229.2	4.9	109	H2S Odor	2.81
MW-6	6/28/2007 15:46	14.95	7.54	517	15.8	0.52	2.4	-96.3	8.5	148	H2S Odor	1.55
MW-7A	6/29/2007 10:18	11.55	6.67	777	14.12	1.46	0.35	183.1	5.3	113	Clear	0.2
October 2007 Sampling Event												
MW-1	10/16/2007 10:11	18.7	6.63	1023	16.66	0.67	1.22	-192.5	4.6	76	H2S	2.3
MW-3	10/16/2007 13:33	15.6	6.86	8016	16:46	0.35	9.87	-313.3	4.1	76	Rusty brown, slight H2S	0.9
MW-4A	10/15/2007 12:43	15.1	6.73	5985	16.57	0.18	3.9	-409.8	3.6	62	H2S	2.7
MW-5	10/15/2007 15:12	12.9	7.2	4236	16.08	0.16	6.6	-418.9	4.1	76	H2S	2.0
MW-6	10/16/2007 11:36	13.7	7.18	478	16.16	0.61	5.14	-270.5	3.7	89	Reddish particles	0.9
MW-7A	10/16/2007 15:01	11.5	6.48	850	16.6	0.44	0	26	2.4	74	Clear	0.2

* Drawdown is the distance in feet the water level changed during the sampling process.



Table 2: PCB Aroclor Results from June and October 2007 Sampling Events

Well ID	Date	Result (µg/L)													
		Aroclor 1016	Final Qual	Aroclor 1221	Final Qual	Aroclor 1232	Final Qual	Aroclor 1242	Final Qual	Aroclor 1248	Final Qual	Aroclor 1254	Final Qual	Aroclor 1260	Final Qual
MCP GW-3 Criteria		10		10		10		10		10		10		10	
MW-1	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0880		0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/16/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
MW-3	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0790		0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/16/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0890		0.0053	U ¹	0.0043	U ¹
MW-4A	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0610		0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/15/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0690		0.0053	U ¹	0.0043	U ¹
MW-5	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/15/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0970		0.0053	U ¹	0.0043	U ¹
MW-6	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0081		0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/16/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
MW-7A	6/29/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0095	
	10/16/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
Field QC															
MW-4A	10/15/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0690		0.0053	U ¹	0.0043	U ¹
MW-4A REP	10/15/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0680		0.0053	U ¹	0.0043	U ¹
MW-5	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
MW-5 REP	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
Equipment Blank	6/28/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹
	10/18/2007	0.0061	U ¹	0.0033	U ¹	0.0071	U ¹	0.0066	U ¹	0.0071	U ¹	0.0053	U ¹	0.0043	U ¹

Notes:

MCP: Massachusetts Contingency Plan, Method 1 MCP GW-3 standard from 310 CMR 40.0974(2).

NA = not available

¹ 'U' qualifier indicates chemical not detected at concentration above the laboratory reporting limit.



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Table 3: Metals Results from June and October 2007 Sampling Events

Well ID	Date	Result (µg/L)							
		Cadmium	Final Qual	Chromium	Final Qual	Copper	Final Qual	Lead	Final Qual
MCP GW-3 Criteria		4		300		NA		10	
MW-1	6/28/2007	0.18		2.668	U ²	1.668	U ²	1.028	
	10/16/2007	0.269		5.16	U ²	2.66		1.11	
MW-3	6/28/2007	0.039		3.778	U ²	3.467	U ²	0.046	U ²
	10/16/2007	0.19		8.79	U ²	1.87		0.221	U ²
MW-4A	6/28/2007	0.055		4.96		4.633		0.413	
	10/15/2007	0.021		9.96		0.622	U ²	0.159	U ²
MW-5	6/28/2007	0.042		1.201	U ²	3.422	U ²	0.052	
	10/15/2007	0.028		7.73	U ²	0.653	U ²	0.123	U ²
MW-6	6/28/2007	0.079		2.505	U ²	1.752	U ²	0.292	
	10/16/2007	0.033		1.83	U ²	0.707	U ²	0.102	U ²
MW-7A	6/29/2007	0.537		1.155	U ²	3.996	U ²	0.076	
	10/16/2007	0.718		3.64	U ²	5.86		0.078	U ²
Field QC									
MW-4A	10/15/2007	0.021		9.96		0.622	U ²	0.159	U ²
MW-4A REP	10/15/2007	0.018		6.4	UJ ²	0.594	U ²	0.061	U ²
MW-5	6/28/2007	0.042		1.201	U ²	3.422	U ²	0.052	
MW-5 REP	6/28/2007	0.042		1.367	U ²	2.164	U ²	0.027	UJ ²
Equipment Blank	6/28/2007	0.0032		0.93		0.857		0.01	
	10/16/2007	0.001	U ¹	1.79		0.293		0.0761	
Method Detection Limit		0.001		0.08		0.004		0.001	

MCP: Massachusetts Contingency Plan, Method 1 MCP GW-3 standard from 310 CMR 40.0974(2).

NA = not available

¹ 'U' qualifier indicates chemical not detected at concentration above the laboratory reporting limit

² 'U' qualifier indicates chemical not detected at concentration above 5x equipment blank values

J = estimated value

Appendix A

Field Logs

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Groundwater Sample Collection Record

Client: USACE Date: 6-28-08 Time: 9:08 Start: 0908 am/pm
 Project No: G606422 Finish: 1109 am/pm
 Site Location: New Bedford Harbor
 Weather Conditions: overcast Collectors: J. Fitch, T. Himmer, S. Walton

1. WATER LEVEL / WELL DATA

Measured Well Depth: 24.6' Height of Water Column: 13.75' 0.16 GAL/FT (2 IN)
 0.65 GAL/FT (4 IN) = 2.20 Gallons (Volume)
 1.5 GAL/FT (6 IN) = 8.33 L
 Depth to Water: 10.85' from top of metal casing Purged Volume: 2.55 L

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
Sonde	YSI	600K	05E2392
Turb. Meter	LAMORTE	2020	4074-1103
GEO Pump II	Geotech	II	466

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
0936 0932	21.25	-	11.1%	7.31	-260.6	0.65	-	170 mL/min	-	
0946	16.4	4866	9.09%	7.3	-260.8	1.8	1.2	120 mL/min	-12.95	-2.1
0949	16.39	4824	7.19%	7.34	-266.3	1.6	1.8	120 mL/min	-13.13	-2.28
1010	17.68	4746	3.7%	7.49	-286.4	3.4	1.95	60 mL/min	-12.60	self-bleed - no color
1013	18.67	4792	5.4%	7.52	-283.0	1.5	2.1	50 mL/min	-12.71	-1.85
1016	17.99	4690	5.0%	7.53	-283.3	1.3	2.25	"	-12.81	-1.96
1019	17.6	4620	4.4%	7.54	-284.8	1.9	2.4	"	-12.87	-2.04
1021	17.31	4518	4.1%	7.55	-285.8	1.8	2.55	"	-12.96	-2.11

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-04A-062807	3 (2MYMD)	Amber Bottle	4°C ± 2	PCB	1022
MW-04A-062807	2 (1MYMD)	Teflon Bottle	Nitric Acid	Metals	"

NOTES: 1. 250 mL per min - drawdown to 11.25
 #2 190 mL per min 11.21 → 11.41
 and depth - 14.9 ft
 12.42 ft @ pump initiation @ 1007
 new flow rate 60 mL/min
 10.85' depth to water
 Drawdown

Signature: [Signature] Date: 7/2/08

Groundwater Sample Collection Record

Client: USACE Date: 6/20 11:12 Time: Start 11:12 am/pm
Project No: G606422 Finish 12:40 am/pm
Site Location: NBH CDF
Weather Conditions: overcast, breezy Collectors: JME, TH, SW

1. WATER LEVEL / WELL DATA

Measured Height of 0.16 GAL/FT (2 IN)
Well Depth: 19.13' Water Column: 9.42 0.65 GAL/FT (4 IN) = 1.51 Gallons (Volume)
1.5 GAL/FT (6 IN) 5.712
Depth to Water: 9.71 Purged Volume: 4.96

2. SAMPLE COLLECTION

Method:

150 ml/min
initial purge rate

Field Equipment Used:

	Equipment	Make	Model	Serial Number
Sonde	<u>YST TH</u>	<u>LODGE</u>	<u>451</u>	<u>660R</u>
	<u>05E2392</u>			
Turb. Meter	<u>LA Motte</u>	<u>2020</u>		<u>4694-1103</u>
Geo Pump	<u>II</u>	<u>GETTE</u>	<u>660R</u>	<u>466</u>

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
1125	18.1	3003	16.7%	8.14	-183.1	2.9	3.90	130 ml/min	10.5	H ₂ S odor
1128	17.41	2907	13.7%	8.00	-181.1	2.4	3.78	130 ml/min	10.85	
1131	17.60	2922	10.2%	7.92	-191.5	2.7	1.17	130 ml/min	11.05	
1134	17.5	2924	7.0%	7.8	-194.4	3.0	1.80	130 ml/min	11.25	
1137	17.54	2899	6.1%	7.81	-194.6	2.5	1.95	130 ml/min	11.37	
1140	17.02	2958	5.5%	7.78	-197.2	2.6	2.08	130 ml/min	11.5	
1143	16.85	2988	4.8%	7.79	-199.6	2.7	2.47	130 ml/min	11.65	
1146	16.87	3030	4.3%	7.8	-204.2	2.4	2.86	130 ml/min	11.75	
1149	16.86	3092	3.8%	7.8	-207.9	1.5	3.25	130 ml/min	11.9	
1154	16.76	3175	3.2	7.85	-213.1	1.6	3.64	130 ml/min	12.0	
1159	16.93	3239	2.7%	7.87	-224.2	2.4	4.03	109 ml/min	12.2	

Depth to water

Drawdown

5/6 3.97

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-005-062807	21	1 L Amber	4°C	PCB	1215
"	2	Teflon	Acid	Metals	
MW-005-062807-REP	1	1 L Amber	4°C	PCB	
"	1	Teflon	Acid	METALS	

NOTES:

⊕ includes extra volume for metals MS/MSD TH 6/28/07

Signature: see next

Date: _____

2062

Battelle

The Business of Innovation

Well ID

MW-5

Groundwater Sample Collection Record

Client: USACE Date: _____ Time: _____ Start: _____ am/pm
Project No: _____ Finish: _____ am/pm
Site Location: NBH
Weather Conditions: overcast, breezy Collectors: _____

1. WATER LEVEL / WELL DATA

Measured _____ Height of _____ 0.16 GAL/FT (2 IN)
Well Depth: _____ Water Column: _____ 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
Depth to _____ Purged _____ 1.5 GAL/FT (6 IN)
Water: _____ Volume: _____

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number

Depth to Water

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
1204	16.86	3257	2.87	7.90	-225.2	1.8	4.3	109 mL/min	12.32	H ₂ S odor
1209	16.76	3296	2.56	7.91	-229.4	1.5	4.6	109 mL/min	12.45	
12:12	16.59	3370	2.49	7.93	-229.2	1.2	4.9	109 mL/min	12.52	
12:17									13.0'	at 12:48
										end

Sample ID _____ No. Containers _____ Container Type _____ Preservation _____ Analysis Req. _____ Time _____

NOTES:

Signature: _____

Date: _____

7/2/07

Groundwater Sample Collection Record

Client: <u>USACE</u>	Date: <u>6/28/07</u> <u>12:54</u>	Time: Start <u>12:54</u> am/pm <u>pm</u>
Project No: <u>6606422</u>	Finish <u>1420</u> am/pm	
Site Location: <u>NBH</u>		
Weather Conditions: <u>overcast + breezy</u>	Collectors: <u>JMF + TH + SW</u>	

1. WATER LEVEL / WELL DATA

Measured	Height of	0.16 GAL/FT (2 IN)
Well Depth: <u>23.9</u>	Water Column: <u>8.8'</u>	0.65 GAL/FT (4 IN) = <u>1.41</u> Gallons (Volume)
		1.5 GAL/FT (6 IN) <u>5.33 L</u>
Depth to	Purged	
Water: <u>15.1 from top</u>	Volume: <u>6.4 L</u>	

of casing

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
SONDE	USI	600R	05 E2392
TURB METER	LAMOTTE	2020	4074 -1103
GEO PUMP	GEO TECH	II	466

Depth to water Draw down = 1.7'

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
1311	15.83	4952	7.4%	7.49	-158.6	40	0.5	148 ml/min	16.8	H ₂ S - slight
1316	15.82	4776	6.3%	7.42	-158.2	25	12.2	148 ml/min	16.8	
1321	15.55	4579	4.7%	7.42	-170.1	19	1.9	148 ml/min	16.8	
1326	15.36	4462	3.4%	7.44	-180.8	13	2.6	142 ml/min	16.8	
1331	15.33	4391	2.8%	7.44	-190.1	7.6	3.3	142 ml/min	16.8	
1336	15.50	4361	2.5	7.44	-197.2	5.9	4.1	156 ml/min	16.8	
1341	15.36	4327	2.2	7.44	-198.9	5.9	4.9	156 ml/min	16.8	
1344	15.45	4330	2.1	7.47	-200.8	4.7	5.4	156 ml/min	16.8	
1347	15.5	4319	1.9	7.38	-203.9	4.9	5.9	158 ml/min	16.8	
1350	15.58	4322	1.8	7.35	-205.1	7.0	6.4	158 ml/min	16.8	

Rust colored particles

① slg
159.2

end depth 17.1

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-003-062807	1	1 L Amber	Cold	PERM PCB	1353
MW-003-062807	1	Teflon	Acid	Metal	
MW-003-0628-0708A	2	1 L Amber	Cold	PCB	
MW-003-062807-0708A	1	Teflon	Acid	Metal	

NOTES:

- QASplit taken
- vial has lots of condensation going to collect samples

Collected Eq. Blank after MW-3 - EB-062807-01 2:25 pm

Signature: DMDate: 7/2/07

Groundwater Sample Collection Record

Client: <u>USALE</u>	Date: <u>6/28/2007</u>	Time: <u>1445</u> am/pm
Project No: <u>5606422</u>	Finish: <u>1615</u> am/pm	
Site Location: <u>NBH</u>		
Weather Conditions: <u>rainy, breezy</u>	Collectors: <u>TH, JF, SW</u>	

1. WATER LEVEL / WELL DATA

Measured Well Depth: <u>18.9</u>	Height of Water Column: <u>5.5'</u>	0.16 GAL/FT (2 IN)
		0.65 GAL/FT (4 IN) = <u>0.88</u> Gallons (Volume)
		1.5 GAL/FT (6 IN) <u>3.33L</u>
Depth to Water: <u>13.4</u>	Purged Volume: <u>8.5L</u>	

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
SONDE	YSI	6002R	05E2392
TURB. METER	LAMOTTE	2020	4074-1103
GEO PUMP	Geotech	II	466

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
<u>1445</u>	<u>17.84</u>	<u>49501</u>	<u>19.0</u>	<u>7.27</u>	<u>53.4</u>	<u>19</u>	<u>0.7</u>	<u>140ml/min</u>	<u>14.8</u>	<u>NONE</u>
<u>1459</u>	<u>17.64</u>	<u>5091</u>	<u>12.8</u>	<u>7.03</u>	<u>52.3</u>	<u>11</u>	<u>1.4</u>	<u>140ml/min</u>	<u>15.05</u>	<u>↓</u>
<u>1501</u>	<u>16.71</u>	<u>512</u>	<u>9.5</u>	<u>7.06</u>	<u>23.2</u>	<u>9.2</u>	<u>2.1</u>	<u>146ml/min</u>	<u>15.0</u>	
<u>1509</u>	<u>16.37</u>	<u>512</u>	<u>8.2</u>	<u>7.16</u>	<u>-9.8</u>	<u>6.1</u>	<u>2.8</u>	<u>146ml/min</u>	<u>15.0</u>	
<u>1514</u>	<u>16.19</u>	<u>513</u>	<u>7.1</u>	<u>7.28</u>	<u>-30.5</u>	<u>5.7</u>	<u>3.6</u>	<u>146ml/min</u>	<u>15.0</u>	
<u>1519</u>	<u>16.03</u>	<u>513</u>	<u>6.8</u>	<u>7.37</u>	<u>-41.9</u>	<u>6.5</u>	<u>4.3</u>	<u>146ml/min</u>	<u>15.0</u>	
<u>1524</u>	<u>15.68</u>	<u>518</u>	<u>6.1</u>	<u>7.44</u>	<u>-54.4</u>	<u>3.8</u>	<u>5.1</u>	<u>166ml/min</u>	<u>15.1</u>	
<u>1529</u>	<u>15.67</u>	<u>516</u>	<u>7.4</u>	<u>7.46</u>	<u>-63.8</u>	<u>7.4</u>	<u>6.0</u>	<u>166ml/min</u>	<u>15.17</u>	
<u>1534</u>	<u>15.60</u>	<u>517</u>	<u>6.6</u>	<u>7.48</u>	<u>-74.0</u>	<u>7.3</u>	<u>6.8</u>	<u>166ml/min</u>	<u>15.17</u>	
<u>1539</u>	<u>15.47</u>	<u>517</u>	<u>5.7</u>	<u>7.50</u>	<u>-81.0</u>	<u>6.1</u>	<u>7.3</u>	<u>166ml/min</u>	<u>15.17</u>	

Depth to water

Drawdown

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
<u>MW-006-062807</u>	<u>1</u>	<u>Ambu Jar</u>	<u>4° ± 2°C</u>	<u>P.B.</u>	<u>1530</u>
<u>↓</u>	<u>1</u>	<u>Teflon Jar</u>	<u>Nitric Acid</u>	<u>Metals</u>	<u>↓</u>

NOTES:

- outside of fence
- need to add gate

end depth 14.9

Signature: MHDate: 7/2/07

2002

Well ID

NW-6

Groundwater Sample Collection Record

Client: _____ Date: _____ Time: _____ Start _____ am/pm
Project No: _____ Finish _____ am/pm
Site Location: _____
Weather Conditions: _____ Collectors: _____

1. WATER LEVEL / WELL DATA

Measured _____ Height of _____ 0.16 GAL/FT (2 IN)
Well Depth: _____ Water Column: _____ 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
Depth to _____ Purged _____ 1.5 GAL/FT (6 IN)
Water: _____ Volume: _____

2. SAMPLE COLLECTION

Method: _____

Field Equipment Used:

Equipment	Make	Model	Serial Number

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	% DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
1540	15.63	516	5.4	7.51	-87.9	5.2.1	657.7	148 ml/min	15.10	+
1543	15.9	517	5.1	7.53	-93.5	1.9	6.98.1	148 ml/min	15.0	
1546	15.8	517	5.3	7.54	-96.3	2.4	338.5	148 ml/min	14.95	

Depth to water

Drawdown

1.70

1.60

1.55

Sample ID _____ No. Containers _____ Container Type _____ Preservation _____ Analysis Req. _____ Time _____

NOTES:

Signature: _____

[Signature]

Date: _____

7/2/07

Groundwater Sample Collection Record

Client: USALE Date: 6/28/07 Time: Start 1640 am/pm
 Project No: G606422 Finish 1805 am/pm
 Site Location: NBH CDF
 Weather Conditions: unny - occasional breeze Collectors: JMF, TH, HWS/bsw TH 6/28/07

1. WATER LEVEL / WELL DATA

Measured Height of 0.16 GAL/FT (2 IN)
 Well Depth: 23.9 Water Column: 7.4' 0.65 GAL/FT (4 IN) = 1.18 Gallons (Volume)
 1.5 GAL/FT (6 IN) 4.48L
 Depth to Water: 16.50 Purged Volume: 6 3L

from top of PVC casing

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
<u>SONDE</u>	<u>YSI</u>	<u>600R</u>	<u>0502392</u>
<u>TURB METER</u>	<u>LOROTTE</u>	<u>2020</u>	<u>4074-1103</u>
<u>GEDPUMP</u>	<u>GEDTECH</u>	<u>I</u>	<u>466</u>

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
<u>16:54</u>	<u>19.53</u>	<u>756</u>	<u>13.7</u>	<u>7.27</u>	<u>59.1</u>	<u>45</u>	<u>0.7</u>	<u>130</u>	<u>17.85/135</u>	<u>RUSTY / NA</u>
<u>16:59</u>	<u>18.86</u>	<u>755</u>	<u>9.4</u>	<u>7.13</u>	<u>58.5</u>	<u>26</u>	<u>1.4</u>	<u>130</u>	<u>18.25/115</u>	<u>RUSTY</u>
<u>17:04</u>	<u>18.51</u>	<u>763</u>	<u>8.0</u>	<u>7.18</u>	<u>58.1</u>	<u>16</u>	<u>2.1</u>	<u>130</u>	<u>18.6/2.1</u>	<u>get some rust.</u>
<u>17:09</u>	<u>18.72</u>	<u>758</u>	<u>9.5%</u>	<u>7.21</u>	<u>-18.2</u>	<u>11</u>	<u>2.6</u>	<u>97</u>	<u>18.8/2.3</u>	
<u>17:14</u>	<u>19.15</u>	<u>679</u>	<u>11.2%</u>	<u>7.23</u>	<u>-51.5</u>	<u>12</u>	<u>3.1</u>	<u>97</u>	<u>18.8/2.3</u>	<u>↓</u>
<u>17:19</u>	<u>19.13</u>	<u>773</u>	<u>12.2%</u>	<u>7.25</u>	<u>-62.5</u>	<u>12</u>	<u>3.7</u>	<u>12.97</u>	<u>18.7/2.2</u>	<u>TH</u>
<u>17:24</u>	<u>19.09</u>	<u>781</u>	<u>17.16</u>	<u>7.26</u>	<u>-73.6</u>	<u>10</u>	<u>4.3</u>	<u>112</u>	<u>18.7/2.2</u>	
<u>17:29</u>	<u>18.90</u>	<u>920</u>	<u>22.7</u>	<u>7.26</u>	<u>-83.4</u>	<u>10</u>				
<u>17:34</u>										

Sample ID No. Containers Container Type Preservation Analysis Req. Time

See next

NOTES:

④ Stopped & rinsed ysi b/c of variable DO values - once rinsed YSI read atmosphere @ ~96% O

Signature:

See next

Date:

Groundwater Sample Collection Record

Client: _____ Date: _____ Time: _____ Start _____ am/pm
 Project No: _____ Finish _____ am/pm
 Site Location: _____
 Weather Conditions: _____ Collectors: _____

1. WATER LEVEL / WELL DATA

Measured _____ Height of _____ 0.16 GAL/FT (2 IN)
 Well Depth: _____ Water Column: _____ 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
 _____ 1.5 GAL/FT (6 IN)
 Depth to _____ Purged _____
 Water: _____ Volume: _____

2. SAMPLE COLLECTION

Method: _____

Field Equipment Used:

Equipment	Make	Model	Serial Number

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
17:35	20.44	842	31.57	7.26	-93.0	90	4.4	96	18.05/1.55	Rusty
17:40	19.18	840	30.29	7.26	-87.7	24.5/6	34.7/4.8	96	17.95/1.45	clear
17:43	18.74	835	28.57	7.25	-86.4	13	5.1	96	17.85/1.35	clear
17:46	18.55	838	27.87	7.23	-87.4	9.2	5.4	96	17.8/1.3	clear
17:49	18.50	842	25.97	7.22	-89.9	5.5	6.73/5.7	96	17.75/1.25	clear
17:52	18.42	844	23.6	7.21	-92.8	5.8	7.6.0	96	17.72/1.23	clear
17:55	18.17	848	22.5	7.19	-93.4	5.6	6.3	96	17.7/1.1	1.2 clear
17:5										

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-001-062807	1	1L Amber	4°C	PCB	17:56
"	1	4L Tetra	Acid	metals	

NOTES:

Due to inclement weather the sample was collected before turbidity completely stabilized, since other parameters were acceptable

Signature: _____

Date: _____

7/2/07

Groundwater Sample Collection Record

Client: USACE Date: 6/29/07 Time: Start 9:33 am/pm
 Project No: 6060422 Finish _____ am/pm
 Site Location: New Bedford Harbor CDF
 Weather Conditions: cool, breeze Collectors: TH/JF

1. WATER LEVEL / WELL DATA

Measured _____ Height of _____ 0.16 GAL/FT (2 IN)
 Well Depth: 14.82 Water Column: 3.47' 0.65 GAL/FT (4 IN) = 0.56 Gallons (Volume)
 1.5 GAL/FT (6 IN) 2.10L
 Depth to _____ Purged _____
 Water: 11.35 Volume: 5.3L

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
<u>SONDE</u>	<u>YSI</u>	<u>600R</u>	<u>05E2392</u>
<u>TURB METER</u>	<u>LAMORTE</u>	<u>2020</u>	<u>4074-1103</u>
<u>GEO PUMP</u>	<u>GEO TECH</u>	<u>II</u>	<u>464</u>

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Removed (Liters)	Flow Rate (mL/min)	Drawdown (Feet)	Color/Odor
<u>9:33</u>	<u>18.03</u>	<u>934</u>	<u>40.6%/30</u>	<u>6.25</u>	<u>114</u>	<u>1.9</u>	<u>0.4</u>	<u>130/133</u>	<u>11.45/0.1</u>	<u>clear/none</u>
<u>9:42</u>	<u>14.56</u>	<u>837</u>	<u>21.2%/22</u>	<u>6.56</u>	<u>140.1</u>	<u>1.0</u>	<u>0.9</u>	<u>109</u>	<u>11.50/0.15</u>	<u>"</u>
<u>9:48</u>	<u>14.44</u>	<u>777</u>	<u>20.4/2.08</u>	<u>6.62</u>	<u>138.2</u>	<u>0.8</u>	<u>1.5</u>	<u>110</u>	<u>11.50/0.15</u>	<u>"</u>
<u>9:52</u>	<u>14.40</u>	<u>755</u>	<u>18.7/1.92</u>	<u>6.63</u>	<u>174.6</u>	<u>0.25</u>	<u>2.1</u>	<u>113</u>	<u>11.50/0.15</u>	<u>"</u>
<u>9:57</u>	<u>14.24</u>	<u>741</u>	<u>17.0/1.33</u>	<u>6.65</u>	<u>192.9</u>	<u>0.30</u>	<u>2.7</u>	<u>113</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:02</u>	<u>14.18</u>	<u>745</u>	<u>16.0/1.63</u>	<u>6.66</u>	<u>194.2</u>	<u>0.40</u>	<u>3.3</u>	<u>113</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:07</u>	<u>14.14</u>	<u>754</u>	<u>15.1/1.55</u>	<u>6.67</u>	<u>185.4</u>	<u>0.15</u>	<u>3.9</u>	<u>113</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:12</u>	<u>14.11</u>	<u>765</u>	<u>14.5/1.48</u>	<u>6.67</u>	<u>179.2</u>	<u>0.35</u>	<u>4.4</u>	<u>112</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:17</u>	<u>14.11</u>	<u>770</u>	<u>14.4/1.47</u>	<u>6.67</u>	<u>179.3</u>	<u>0.35</u>	<u>4.8</u>	<u>112</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:18</u>	<u>14.12</u>	<u>777</u>	<u>14.2/1.46</u>	<u>6.67</u>	<u>183.1</u>	<u>0.35</u>	<u>5.3</u>	<u>113</u>	<u>11.55/0.20</u>	<u>"</u>
<u>10:21</u>	<u>N/A - TH</u>									

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
<u>MW-07A-062907</u>	<u>1</u>	<u>1L Amber</u>	<u>4°C</u>	<u>PCB</u>	<u>10:21</u>
<u>6</u>	<u>1</u>	<u>Teflon</u>	<u>Acidified</u>	<u>Metals</u>	

NOTES:

init. pump @ 9:33 to fill cell.

Signature: [Signature] Date: 7/2/07

Groundwater Sample Collection Record

Client: USACE Date: 10/15/07 Time: 1130 Start 1130 am/pm
 Project No: New Bedford Harbor Finish 1320 am/pm
 Site Location: Sanger Street
 Weather Conditions: Collectors: JMF/TMH

1. WATER LEVEL / WELL DATA

Measured Well Depth: 24.4 Height of Water Column: 12.4 0.16 GAL/FT (2 IN)
 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
 1.5 GAL/FT (6 IN)
 Depth to Water: 12 ft from well casing Purged Volume: ~3612 ml

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
TURB. METER	LAMORTE	2020	
PUMP	QED	1.75" SAMPLE PRO	
CONTROLLER	QED	MPID	
COMPRESSOR	WELL WIZARD	3020	
YSI		600 XLM	

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Volume Removed (Liters)	Flow Rate (mL/min)	Depth to Water (Feet)	Drawdown (Feet)	Color/Odor
11:54	16.36	7015	6.05	6.79	-357.6			130	13.7	1.7	Sluff
12:02	17.03	6848	3.69	6.75	-378.3	10.0		141 140	14.1	2.1	
12:07	17.90	6747	3.59	6.75	-399.1	12.0			14.1	2.1	
12:12	17.78	6705	0.43	6.68	-397.2	9.2		62	14.2	2.2	
12:16	17.21	6495	0.30	6.66	-408.0	6.8		↓	14.3	2.3	
12:21	17.03	6360	0.27	6.70	-407.8	4.6		↓	14.4	2.4	
12:26	17.00	6264	0.24	6.67	-406.8	5.2		↓	14.45	2.45	
12:31	17.17	6222	0.20	6.66	-398.9	11.6		↓	14.5	2.5	
12:34	17.04	6195	0.19	6.65	-400.0	8.4		↓	14.6	2.6	
12:37	16.85	6116	0.18	6.67	-402.4	5.3			14.65	2.65	
12:41	16.66	6044	0.18	6.70	-407.3	4.2			14.7	2.7	
12:43	16.57	5985	0.18	6.73	-409.8	3.9			14.7	2.7	* Sample collected
									15.1	@end of collection	
									↑ 3.1		

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-04A-101507	2	Glass/Teflon	Cold/Acid	Metals/PCB	12:45
Field Duplicate	2	Glass/Teflon	Cold/Acid	PCB/Metals	1:00
MW-04A-101507-REP					

NOTES:

① Dropped flow rate to 42 mL/min.

Signature: [Signature]

Date: 10/15/07

Well ID MW-5

Groundwater Sample Collection Record

Client: USACE Date: 10/15/07 Time: Start 1405 am/pm
 Project No: New Bedford Harbor Finish 1533 am/pm
 Site Location: Savage Street
 Weather Conditions: Partly Cloudy ~60° Collectors: JMF/TMH

@ 62 ml/min

1. WATER LEVEL / WELL DATA

Measured Well Depth: 19 Height of Water Column: 8.1 0.16 GAL/FT (2 IN)
 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
 1.5 GAL/FT (6 IN)
 Depth to Water: 19 10.9 Purged Volume: ~4076 ml

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
TURB METER	LAMORTE	2020	-
PUMP	QED	1.75" SAMPLE PRO	-
CONTROLLER	QED	MP10	-
COMPRESSOR	WELL WIZARD	3020	-
USF		1000XLM	-

Time (24 hr)	37° Temp (°C)	37° Spec Cond. (µS/cm)	10% DO (mg/L)	±0.1 pH	±10 mV ORP (mV)	10% Turbidity (NTU)	Volume Removed (Liters)	Flow Rate (mL/min)	Depth to Water (Feet)	Drawdown (Feet)	Color/Odor
1411	18.55	4420	2.79	7.29	-284.2	47.4		62	11.1	0.2	sulfur
1416	17.45	4356	1.22	7.27	-359.4	44.8		80	11.4	0.5	
1421	17.09	4333	0.58	7.26	-284.3	40.3		"	11.6	0.7	
1426	17.12	4320	0.35	7.26	-259.5	41.1		"	11.8	0.9	
1431	16.86	4323	0.23	7.25	-328.5	34.8		68	11.9	1.1	
1436	16.52	4320	0.20	7.25	-362.2	29.0		"	12.1	1.2	
1441	16.60	4297	0.15	7.25	-383.4	25.0		62	12.2	1.3	
1446	16.61	4292	0.14	7.23	-393.6	19.2		76	12.4	1.5	
1449	16.62	4288	0.13	7.23	-403.9	17.1			12.5	1.6	
1451	16.58	4285	0.13	7.22	-408.6	15.9			12.6	1.7	
1454	16.54	4281	0.13	7.22	-412.4	14.4			12.7	1.8	
1457	16.49	4270	0.13	7.21	-414.6	12.7			12.7	1.8	
1500	16.41	4267	0.14	7.20	-420.1	10.5		76	12.7	1.8	
1503	16.36	4259	0.14	7.21	-422.8	9.43			12.8	1.9	
1506	16.30	4254	0.15	7.20	-423.0	8.4			12.8	1.9	
1509	16.17	4239	0.15	7.20	-426.1	7.17			12.9	2.0	
1512	16.08	4236	0.16	7.20	-419.9	6.6			12.9		

@ lowest setting

* 1513 0.19 JMF

Sample ID MW-005-101507 No. Containers 2 Container Type Glass/Teflon Preservation 4°C/Acid Analysis Req. PCB/Teflon Time 1513

NOTES:

• Replaced Bladder
 13.3 final depth

* Sample taken turbidity just outside of acceptance but drawdown is very high. All other parameters are stable. JMF

Signature: JMF

Date: 10/15/07

Groundwater Sample Collection Record

Client: USACE Date: 10/16/07 Time: Start 0835 am/pm
 Project No: New Bedford Harbor Finish 1030 am/pm
 Site Location: Sanger Street
 Weather Conditions: Sunny, clear, breezy Collectors: JMF/TMH

1. WATER LEVEL / WELL DATA

Measured Well Depth: 84.2 Height of Water Column: 7.0 0.16 GAL/FT (2 IN)
 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
 1.5 GAL/FT (6 IN)
 Depth to Water: 17.2 ^{one pump} Purred Volume: 24567 ml
16.4 ^{post pump}

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
TURB METER	LAMORTE	2020	—
PUMP	OED	1.75" SAMPLE PRO	—
CONTROLLER	OED	MP10	—
COMPRESSOR	WELL WIZARD	3020	—
TSI		6000 KLM	—

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Volume Removed (Liters)	Flow Rate (mL/min)	Depth to Water (Feet)	Drawdown (Feet)	Color/Odor
0857	16.42	800	5.89	6.82	44.1	20.4		100	17.5	1.1	
0902	16.39	914	3.69	6.77	28.0	14.4		100	17.9	1.5	
0907	16.53	851	3.82	6.76	-102.0	11.9		56	18.0	1.6	slight sulfur
0912	16.39	970	2.96	6.71	-113.6	15.9			18.2	1.8	
0917	16.27	885	1.77	6.67	-127.8	14.8		78	18.3	1.9	
0922	16.39	925	1.29	6.63	-145.5	9.57		72	18.35	1.95	
0927	16.28	954	1.22	6.63	-157.1	6.04		20	18.2	1.8	
0932	15.88	978	1.42	6.67	-164.7	5.18		30	18.1	1.7	
0937	16.26	982	1.51	6.69	-170.2	2.98		36	18.0	1.6	
0942	16.62	990	1.61	6.68	-174.8	3.0		46	17.9	1.5	
0947	16.81	1000	1.59	6.6	-178.0	3.95			17.9	1.5	
0952	16.51	1018	1.41	6.64	-183.3	3.3			17.6	1.2	
0957	16.49	1015	1.25	6.65	-186.9	2.4		59	17.7	1.3	
1002	16.62	1021	1.02	6.65	-189.9	1.9			17.7	1.3	
1005	16.40	1028	0.81	6.64	-192.9	1.18			18.7	2.3	
1008	16.50	1023	0.65	6.63	-193.1	.89		76	18.65	2.25	
1011	16.66	1023	0.67	6.63	-192.5	1.22			18.7	2.3	

1.0 - flow rate
reduced pump pressure

supplying battery

changed flow rate discharge tubing

Sample ID: MW-001-101607 No. Containers: 2 Container Type: Glass/Teflon Preservation: 4°C/Acid Analysis Req.: PCB/ Metals Time: 10/12

NOTES:

18.6 - H₂O depth @ end of samples

Signature: _____

Date: 10/16/07

Groundwater Sample Collection Record

Client: USACE Date: 10/16/07 Time: Start 1045 am/pm
 Project No: NBH Finish 1215 am/pm
 Site Location: Sauger St.
 Weather Conditions: Sunny, clear Collectors: JMF / TMH

1. WATER LEVEL / WELL DATA

Measured Well Depth: 19.2 Height of Water Column: 5.8 0.16 GAL/FT (2 IN)
 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
 1.5 GAL/FT (6 IN)
 Depth to Water: 13.4 / 12.8 Purged Volume: ~3678 ml

2. SAMPLE COLLECTION

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
PUMP	RED	1.75" SAMPLE PRO	
CONTROLLER	↓	MP 10	
COMPRESSOR		WELL WIZARD 3020	
4SI		600 XLM	
TURB METER		LAMOTTE 2020	

Time (24 hr)	Temp (°C)	Spec Cond. (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Volume Removed (Liters)	Flow Rate (mL/min)	Depth to Water (Feet)	Drawdown (Feet)	Color/Odor
1055	15.76	484	3.58	7.19	-231.1	20.4		90	13.7	0.9	
1100	15.84	477	2.03	7.18	-248.7	14.0		90	13.8	1 ft	Reddish particles
1105	15.77	477	1.53	7.17	-260.2	11.6			13.7	0.9	
1110	16.03	477	1.17	7.17	-265.2	10.8			13.7	0.9	
1115	16.13	478	0.96	7.16	-267.8	9.75			-		
1118	16.19	478	0.87	7.16	-268.2	6.77			13.7	0.9	
1121	16.20	478	0.79	7.17	-268.9	3.39			13.7	0.9	
1124	16.22	478	0.73	7.18	-269.8	2.42		89	13.7	0.9	
1127	16.19	478	0.69	7.17	-270.9	3.22			13.7	0.9	
1130	16.22	478	0.66	7.18	-269.4	5.32			13.7	0.9	
1133	16.21	478	0.63	7.18	-270.7	5.32			13.7	0.9	
1136	16.16	478	0.61	7.18	-270.5	4.55			13.7	0.9	

Sample ID: MW-006-10/16/07 No. Containers: 2 Container Type: Glass/Plastic Preservation: 4°C / Acid Analysis Req.: PCB/Metals Time: 1137
MW-006-10/16/07-MS/MS 2-MS/MSD for PCBs
1 MS/MSD for Metals

NOTES:

Depth @ end of sampling 13.7

Signature: _____

Date: _____

10/16/07

NW-3

3 shorter walls

Client: HP USACE Date: 10/16/07 Time: _____ Start: 1240 am/pm ☒
Project No: NBH Finish: 1351 am/pm ☐
Site Location: Sanger Street
Weather Conditions: Sunny, clear Collectors: JMF/TMF

Measured Well Depth: <u>23.95</u>	Height of Water Column: <u>9.25</u>	0.16 GAL/FT (2 IN)	
		0.65 GAL/FT (4 IN) =	<u> </u> Gallons (Volume)
		1.5 GAL/FT (6 IN)	
Depth to Water: <u>15 / 14.7</u> <u>13.7</u>	Purged Volume: <u>~4086 m</u>		

Equipment	Make	Model	Serial Number
TIRB METER	LAMORTE	2020	—
PUMP	QED	1.75" SAMPLE PRO	—
CONTROLLER	↓	MP10	—
COMPRESSOR	WELL WIZARD	3020	—
YSI		1000 XLM	—

[illegible]

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
MW-003-101607	2	Glass/Teflon	4°C/Acid	PCB/Metals	1334

NOTES:

Final
Well
Depth -
after sampling 15.6

Date:

10/16/07

Groundwater Sample Collection Record

Client: USACE Date: 10/16/07 Time: Start 1415 am/pm
Project No: NBH Finish 1516 am/pm
Site Location: Swanage STREET
Weather Conditions: partly clear, light breeze Collectors: JMF / TTH

Measured _____ Height of _____ 0.16 GAL/FT (2 IN)
Well Depth: 14.8 Water Column: 3.5 0.65 GAL/FT (4 IN) = _____ Gallons (Volume)
1.5 GAL/FT (6 IN)
Depth to _____ Purged _____
Water: 11.3 / Volume: ~2442 ml

Method:

Field Equipment Used:

Equipment	Make	Model	Serial Number
TURB METER	LAMOTIE	2020	NA
PUMP	QED	1.75" SAMPLE PCD	↓
CONTROLLER	↓	MP10	
COMPRESSOR	WELL WIZARD	3020	
4SE		1000 xlm	

[illegible]

Sample ID	No. Containers	Container Type	Preservation	Analysis Req.	Time
NW-007A-101607	2	Glass/Teflon	4°C/Acid	PB/Metals	1502

NOTES:

Well depth @ end of sampling - 11.6 ft

Signature:

Date:

10/16/57

YSI Calibration Form
Daily 2007 GW Monitoring for New Bedford Harbor – G606422

Instrument Model # _____

S/N# _____

Date: <u>10/15/2007</u>		Initials: <u>JMF / TMH</u>	
DO membrane changed? Y <u>(N)</u>		Turbidity Wiper Changed? Y <u>(N)</u>	
Battery Voltage:		Turbidity wiper parks 180° from optics? Y <u>N</u>	
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>1009</u>	<u>1000</u>	Cell constant (4.55 – 5.45)
Depth (ft)			Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>0</u>	<u>0</u>	Turbidity Offset:
Turbidity (NTU) 123 <u>10</u>	<u>10</u>	<u>10</u>	
D.O. (% Sat)	<u>102.8%</u>	<u>100.9%</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>4.04</u>	<u>4.00</u>	
pH 7	<u>7.21</u>	<u>7.00</u>	
ORP	<u>186.6</u>	<u>109.1</u>	
Comments:			

*Lamotte
2020*

Date: <u>10/16/2007</u>		Initials: <u>JMF</u>	
DO membrane changed? Y <u>(N)</u>		Turbidity Wiper Changed? Y <u>N</u>	
Battery Voltage:		Turbidity wiper parks 180° from optics? Y <u>N</u>	
Parameter	Initial Reading	Calibrated Reading	Calibration Data (acceptable range)
Conductivity (mS/cm)	<u>979</u>	<u>1000</u>	Cell constant (4.55 – 5.45)
Depth (ft)			Pressure offset, vented (0 ± 6)
Turbidity (NTU) 0	<u>0</u>	<u>0</u>	Turbidity Offset:
Turbidity (NTU) 123	<u>10.28</u>	<u>10.00</u>	
D.O. (% Sat)	<u>103.0%</u>	<u>101%</u>	D.O. Gain (0.7 - 1.4)
pH 4	<u>3.99</u>	<u>4.00</u>	
pH 7	<u>7.04</u>	<u>7.00</u>	
ORP	<u>108.8</u>	<u>109.1</u>	
Comments:			

*Lamotte
2020*

NOTES:

① 0 and 10 NTU turbidity standards supplied by U.S. Environmental Rental 11:15
- 10/6/27/07
TH 6/27/07
TH

② Cond = 50,000 μS_m @ 25°C initial measured was 47,490, final 30,122 TH 6/27/07

③ YSI calibrated by US Environmental initially, the ORP measurement checked and was
OK not re-calibrated for ORP

Project Name: NBH Groundwater
Project Number: GL06422

Date: 6/29/07

Water Quality Instrument Calibration Log

Parameter	Instrument			Calibration Solution			Standard Value @ 25C	Ambient Temp	Initial Measured Value	Adjusted Measured Value	Initials	Date/Time	Post-Calibration			
	Manufacturer	Model	S/N	Manufacturer	Lot No.	Exp. Date							Ambient Temp	Measured Value	Initials	Date/Time
Dissolved Oxygen	YSI	6002	05E2392	NA	→		100%	~25°C	99.7%	NA	TH	6/29 7:12	NA	→		
pH 4							4.0		4.0	NA	↓	↓	NA	→		
pH 7							7.0	↓	7.2	7.0	TH	↓	25°	7.01	TH	6/29 7:26
Conductivity ⁽¹⁾							500	~25°C	422	500	TH	6/29 7:40	25°	500.5	TH	6/29 7:42
ORP							↓ w/L TH	↓	↓	↓	↓	↓				
Turbidity							0/10	25	0/10	NA	TH	6/29 8:13	25°	10	TH	8:14

NOTES:

① Conductivity Std = ~~500~~ 50 mS/cm, initial value 49.9 no recal performed TH 6/29/07 7:51 6/29 8:14